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The Commonwealth of Massachusetts

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EDWARD J. KING, *Governor*

Executive Office of Economic Affairs
George S. Kariotis, Secretary

DEPARTMENT OF LABOR AND INDUSTRIES
WILLIAM M. SHIPPS, *Commissioner*

DIVISION OF OCCUPATIONAL HYGIENE
HAROLD BAVLEY, P.E., *Director*

GOVERNMENT DOCUMENTS
COLLECTION
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PREVENTION

DETECTION

EVALUATION

CONTROL

ANNUAL REPORT

1980

Originating Office

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Department of Labor and Industries. Division of Occupational Hygiene

39 Boylston Street. Boston. Massachusetts 02116

ANNUAL REPORT
OF THE
DIVISION OF OCCUPATIONAL HYGIENE
FISCAL YEAR 1980

This Annual Report records the program and activities of the Division of Occupational Hygiene, of the Department of Labor and Industries for the fiscal year beginning July 1, 1979, and ending June 30, 1980.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES.

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Harold Bavley, P.E., C.I.H., Director
Leonard D. Pagnotto, M.S., C.I.H., Assistant Director
Edward L. Baker, M.D., Occupational Hygiene Physician
Rexford G. Alexander, M.S., C.I.H., Chief of Engineering Services
Frederick L. Schultz, B.S., Chief of Laboratory
Robin J. Fogg, M.S., Senior Industrial Sanitary Engineer
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Theresa M. Murphy, M.S., R.N., Supervising Occupational Hygiene Nurse
Henry L. Smith, B.S., Senior Chemist
Linda E. Tremblay, B.S., Senior Chemist
Karen F. Irving, M.S., Senior Chemist
Erwin Allen, B.S. (CH.E.) Senior Chemist
Ellen J. Newlands, B.S., Assistant Industrial Hygiene Engineer
Joel P. Weddig, B.S., Assistant Industrial Hygiene Engineer

Publication No. 12229-60-100-12-80-C.R.
Approved by John Manton, Acting State Purchasing Agent

Elaine M. Krueger, M.S., Assistant Chemist
Edward C. Allen, B.S., Assistant Chemist
Frank M. Kramarz, B.S., Assistant Chemist
Kin Ho, B.S., Junior Chemist
Bernice Linde, B.S., Administrative Assistant
Mary S. Chin-Lim, Senior Library Assistant
Joan M. Bando, Principal Clerk
Mary M. Fitzsimmons, Heak Clerk (assigned to Division of Minimum Wage)
A. Rae Yudis, Senior Clerk-Stenographer
Ralph L. Bruno, Senior Clerk-Typist 7

The following personnel changes occurred during Fiscal 1980:

Dr. Lawrence J. Fine, Occupational Hygiene Physician, resigned to take a position with the School of Public Health, University of Michigan. His duties with this Division were assumed by Edward L. Baker, M.D., on a part-time basis. Dr. Baker is associated with the Harvard School of Public Health.

Fred Cohen, Assistant Chemist for the Special Asbestos Commission program resigned to take an engineering position in private industry.

Elaine M. Krueger, Assistant Chemist, resigned to take a position of Senior Pollution Engineer with the Massachusetts Department of Environmental Quality Engineering.

Olga V. Stripinis, Senior Clerk-Stenographer retired on November 21, 1979.

Joan M. Bando, Senior Clerk-Typist was promoted to Principal Clerk on January 28, 1980.

Joel P. Weddig, formerly with Arthur D. Little, Inc., Cambridge, accepted the Division position of Assistant Industrial Hygiene Engineer on December 7, 1979.

Frank M. Kramarz, B.S., and Loraine M. Falls accepted positions as Assistant Chemists with the Special Asbestos Commission program.

Ralph L. Bruno, Senior Clerk-Typist resigned after a two month stay with this ← Division.

Susan R. Woskie, B.S., a participant at the Harvard School of Public Health graduate program was a summer intern.

The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by the legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of industrial health problems.

The Division is divided administratively into an Engineering Section, a Chemical Section including a laboratory, a Medical and Nursing Section, and an Information Section.

GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston. The Division occupies approximately 6150 square feet at this location. There is overcrowding with a need for at least 2000 sq. ft. of additional office space.

A total of 1394 services were undertaken including 494 in-state requests and 54 out-of-state requests for information on matters pertaining to occupational health were answered. These services required a total of 1211 plant visits, 296 visits to other agencies, and 24 talks and lectures by the Division staff. This is a decrease over 1979 of approximately 12.7% for plant visits and a decrease of 1% for other field visits due to position vacancies.

Field studies involved 10,091 measurements of environmental conditions and the collection and analysis of 1130 chemical and 485 dust air samples in places of employment. In addition, the laboratory evaluations included the analysis of 2066 air samples, 1262 urine samples. and 447 material samples, 4111 blood samples, 20 breath samples, and 15 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health, Education and Welfare, and analyzed 100 simulated air

samples for asbestos, lead, cadmium, zinc and solvents, and with West Allis Memorial Hospital for 12 blood samples.

The plant studies and visits resulted in more than 2248 recommendations potentially affecting more than 45,098 workers. There were 225 recommendations completed, potentially affecting 4955 workers.

7(c)(1) ON-SITE CONSULTATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7(c)(1) On-Site Consultation Program sponsored by the U.S. Department of Labor. Occupational Safety and Health Administration (OSHA), which provides on-site consultation in health and safety matters at the employers' requests.

The Division of Occupational Hygiene provides Health Consultants for the solution of industrial hygiene problems in the private sector by the detection, evaluation and control of existing and potential health hazards resulting from occupational exposures.

During Fiscal 1980, 248 requests were received from employers for this free consultation service. Our staff of three health consultants completed a total of 271 surveys which included the backlog of special requests from dentists to evaluate mercury exposures in their dental offices.

The entire health consulting staff has completed the OSHA Consultation Course given by the University of Alabama. The course covers the fundamentals of the On-Site Consultation Program and the development of communicative skills of the consultants.

A special seminar at the University of Wisconsin was attended by the Chief of Engineering Services where the Chemical Laboratory of the University, under contract to OSHA, presented their facilities and their capabilities for analysis of environmental samples. All but a few of the air samples collected by the health consultants of the Massachusetts Division of Occupational Hygiene are analyzed by the Division's own

laboratory.

A minimum of solicitation and publicity has resulted in a backlog of requests from all types of industry in Massachusetts.

The 7(c)(1) On-Site Consultation Program continues as a desirable program for this Division.

SCHOOL COMPLIANCE WITH ASBESTOS CONTROL

Compliance with Asbestos Commission recommendations is voluntary. Schools are under no legal or economic pressure from the Commission to institute the surveillance.

Increased public awareness of the potential health hazards of asbestos and publication of the Asbestos Commission's findings have prompted some school systems to comply with the Commission's recommendations while other school systems have taken action where no hazard existed; several private institutions and some public schools in review categories decided to remove the asbestos material to guarantee that asbestos would not be a concern in the future. Also, schools where asbestos abatement costs are projected at $250,000 or more, have generally deferred action and have expressed an interest in whether federal regulations will be forthcoming. In general, schools that have already taken action are those in which asbestos control bids ranged from $10,000 - $50,000 or schools which expected to receive reimbursement.

For schools involved in asbestos work, compliance with the terms of the contract was a significant problem. The Asbestos Commission offered assistance in overseeing the contractor on-site, and air sampling to determine when the school was thoroughly clean. This surveillance was performed by the D.O.H. Asbestos Program staff.

This system for contract compliance was adequate when the contract was well written and the D.O.H. Staff was notified a week in advance of the start of asbestos work. However, some school systems put out bids and started work without contacting the Asbestos Program Staff during any step in the process. Those schools consistently

ran into problems when the job was completed and where asbestos levels in the schools were high.

SCHOOL ASBESTOS REIMBURSEMENT PROGRAM

A bill allocating $2 million for reimbursement of Asbestos Commission Action Schools (those schools for which the Asbestos Commission recommended controls) was passed in the 1979 legislative session. This refunding program, jointly administered by the School Building Assistance Bureau of the Mass. Dept. of Education and the Division of Occupational Hygiene, reimburses schools from 50% to 75% of the cost of asbestos control work.

Reimbursement is contingent upon the following terms:

1) Control of asbestos in schools must be complete and in accordance with Asbestos Commission recommendations.

2) Asbestos control must proceed in a safe and effective manner.

Final air sampling is provided by the Division's Asbestos Program's staff to ensure complete exposure abatement.

The reimbursement program has largely been a success. It has resulted in school decisions to control potentially hazardous asbestos in most of the worst cases.

All category 7 (action) schools except five had applied for this refunding at the time of this writing.

SCHOOLS IN ONE YEAR ASBESTOS REVIEW

The public schools in this one year review category were to be reviewed when the Environmental Protection Agency (EPA) final regulations were published. The regulations were expected in January of 1980 for promulgation by June 1980. When the regulations did not appear by mid-April, it was decided to initiate the one year review program. Results of the re-survey are listed in the Table below. The EPA regulations are now expected around fall 1980.

During the review program, non-public areas such as boiler rooms, receiving and storage areas were also checked for spray-on asbestos ceilings and asbestos pipe insulation. Even though these areas are not accessible to the public, there is some air exchange between the public and non-public areas.

In several schools, re-survey showed the condition of the sprayed on asbestos material to be deteriorating. Ferris index values increased to the action level in some cases.

Recommendations for these cases will be discussed at future Asbestos Commission meetings.

SCHOOLS REVIEWED AFTER ONE-YEAR

Total Number of Schools in Review Category	Schools Surveyed	Schools with Ferris Index over 21
44	44	3

ASBESTOS COMMISSION PROGRAM - PUBLIC BUILDINGS

Introduction

The Asbestos Commission was originally mandated to investigate all public schools and public buildings relative to asbestos and to recommend appropriate control procedures as needed. During the first two years of the project, efforts were concentrated on public schools. Following completion of the school surveys the Asbestos Commission turned to the task of investigating asbestos use in public buildings.

Scope of the Project

Before starting the public building phase a definition of "public building" was needed in order to limit the scope of the project.

Any building, regardless of ownership, maintaining public access is legally defined as public. Among privately owned buildings which fall under this legal

definition are banks, theaters, nursing homes, airport terminals and private hospitals.

Investigation has revealed there is an extremely large number of these buildings in the state. Furthermore, construction records are generally poor and provide unreliable information, excluding a "paper survey" [illegible]".

Rather than including this category of buildings the Asbestos Commission decided that the study should be limited to publicly owned buildings with public access.

Following this definition, the public buildings in Massachusetts are divided into three categories by owner:

1) State
2) Counties
3) Cities and Towns

A copy of the current Asbestos Commission public building survey sheet is located in Appendix F.

(Federal buildings are under federal jurisdiction, and as such should not be considered in a survey by a state commission).

Public Building Phase - Program Goals and Implementation

Following the same mandate as for public schools, the Commission goals for public buildings are similar but have several important variations.

1. Identify all buildings falling under the Commission's definition of public buildings.
2. Walk-through surveys of all public buildings within a given category, irrespective of year of construction. Collection and analysis of bulk samples.
3. Identify asbestos in non-public areas as well as public areas within a building.

4. Assess condition of spray-on asbestos and asbestos pipe insulation.

5. Recommend methods for control of potentially hazardous asbestos materials.

Bulk Sample Analysis

Bulk sample analysis of public building samples is now accomplished chiefly by means of the following three methods.

1) Phase Contrast Microscopy

This technique is used for screening the bulk samples, and determining the morphology of the materials in the mixture.

2) Polarized Light Microscopy (PLM)

This technique is a relatively rapid method for positive identification of asbestos. It works best when the sample contains a high percentage of asbestos and the individual fibers are large enough to be resolved at lower magnifications.

This technique is emerging as the method of choice of the EPA. Consequently the EPA and Research Triangle Institute have sponsored a proficiency analytical testing (PAT) program for analysis of the bulk samples using PLM. The Asbestos Commission staff has passed the first and only round and has been rated proficient.

3) Transmission Electron Microscopy (TEM)

Samples with negative PLM results were analyzed by electron microscopy. Electron microscopy is the most sensitive and time consuming technique used by the staff. Unfortunately, consistent access to an electron microscope has been difficult during fiscal 1980. Bulk sample analysis has been slowed as a result. At this writing, the staff has a considerable backlog of samples awaiting electron microscopic analysis.

PUBLIC HIGHER EDUCATION INSTITUTIONS

Medical specialists in pulmonary disease believe young populations are most affected by asbestos exposure, being able to live out the 20-40 year latency period. In addition, duration of exposure to asbestos has proved to be a very important factor in contracting asbestos disease.

Considering the fact that students at institutions of higher learning usually consist of young populations and have long residence, the Commission decided to concentrate staff efforts on surveying universities, colleges and related publicly owned institutions among the first group of public buildings.

The staff conducted walk-through surveys of all state universities, colleges, and community colleges. Unlike the surveys conducted in public schools, the buildings were inspected for all uses of friable asbestos; including spray-on and trowelled-on materials, pipe lagging and boiler covering. All buildings were surveyed, regardless of year of construction, not just those built between 1946 and 1973.

To retain consistency, campus public buildings leased from private owners by educational institutions were also surveyed. Bulk samples were collected and brought to the laboratory for analysis. Many samples have been analyzed, some await more intensive electron microscopic analysis. Current survey work is summarized in the following table:

Public Higher Educational Institution Surveys

Educational Institutions	Number of Institutions	Total No. of Bldgs.	Bldgs. Containing a spray-on Coating	Spray-on Containing Asbestos	Bldg. with Asbestos Pipe Lagging	Bulk Samples Pending Analysis	% Surveys Complete
University	3	39	6	2	16	2	67
State Colleges	9	103	24	6	61	2	100
Community Colleges	15	106	25	8	44	7	100
Other Mass. Maritime Academy, Mass. College of Art	2	12	0	0	5	0	100
TOTAL	28	260	55	16	126	11	

PUBLIC HOSPITALS

In accordance with priorities set by the Commission at its' June meeting, the staff has begun surveys of hospitals and mental health institutions. Again, all asbestos uses in hospitals have been investigated in buildings regardless of date of construction. Asbestos pipe lagging may be used extensively in older hospitals and the Commission staff has noted several cases of exposed friable asbestos pipe insulation in public areas. Immediate short term recommendations were made in these instances. Current hospital survey work is listed below.

Table

Hospitals and Mental Health Centers	Total Number of Institutions	Institutions Surveyed	No. of Bldgs. Surveyed	No. of Bldgs. Containing spray-on material
State (*)	29	2	89	3
Municipal	12	8	27	5
County	6	1	0	0
TOTAL	47	11	116	8

(*) Does not include rehabilitative schools or centers which already been surveyed under the school program.

TUMOR REGISTRY BILL

At the February meeting of the Asbestos Commission, Dr. Raymond Murphy, a Commission member, pointed out the need for a tumor registry to aid in future study of asbestos related disease.

A clear definition of the rates of mesothelioma and asbestos related cancers in the Massachusetts population is not currently available. It was suggested that such cases be reported and a file be maintained for asbestos diseases to indicate the trends in the general population.

Senate bill 1952, sponsored by the Department of Public Health, was signed into law at the end of the 1980 legislative session. This bill provides for a central cancer registry of all tumors to be placed in the Department of Public Health.

DRAFT ASBESTOS REGULATIONS - ASBESTOS CONTROL BOARD

In an attempt to fill the gap left by the existing federal and state regulations, and prevent unnecessary asbestos exposure, the Asbestos Commission appointed an ad hoc committee to design feasible regulations at the state level.

Representatives of the Massachusetts Department of Labor and Industries, the Department of Public Health, and the Consumer's Council with help from Boston University's Legislative Services, drafted this outline of a regulatory approach to the asbestos problem.

These regulations as they now stand deal only with asbestos material that is being disturbed, either during asbestos removal and control, or in consequence of other work. They do not mandate that corrective action be taken to prevent fallout from friable asbestos materials already in place if exposure is intermittent. The Asbestos Commission recommended that several schools in Massachusetts with friable asbestos sprayed-on materials take corrective action, either removal, enclosure or encapsulation.

These regulations do not intend to force corrective action where no action is planned, and where the 0.04 f/cc level is not exceeded.

Senate bill 2012, known as the Asbestos Control Board bill, sponsored jointly by Asbestos Commission Chairman Robert McCarthy and Mass. Dept. of Labor and Industries, delegates legal authority to write such regulations and to make revisions in the state building codes with regard to asbestos.

The Asbestos Control Board bill, a late file in the 1980 legislative session, passed through the Senate favorably but was not made law by the end of the 1980 session.

A similar bill will be submitted by the Asbestos Commission, Dept. of Labor and Industries, and Mass. Consumers Council, for consideration during the 1981 legislative session.

ASBESTOS DISPOSAL

Asbestos disposal is regulated by Federal Environmental Protection Agency, the Massachusetts Division of Environmental Quality Engineering, and local boards of health. The Asbestos Commission staff has included a provision for safe asbestos disposal at an approved landfill site in its suggested safe practice bulletin dealing with asbestos removal contracts. However, the great amounts of publicity about the dangers of asbestos have made towns reluctant to accept asbestos, even at E.P.A. and D.E.Q.E. approved sites. This has made legal disposal the most difficult part of asbestos abatement.

ENGINEERING ACTIVITIES

AUTO AUCTION SURVEYED FOR HEALTH HAZARD

This Division office was requested to make a carbon monoxide survey at a newly opened automobile auction. The auction is held weekly and attended by many local car dealers. Several hundred cars are sold in the course of 5-6 hours. The potential carbon monoxide exposure could be hazardous without proper ventilation and traffic control. Four overhead fans supply approximately 53,600 cubic feet of air per minute (cfm). An operating automobile requires 5000 cfm for proper ventilation by dilution. It was calculated that under these conditions, 10.7 automobiles may theoretically operate within this 45,000 square feet arena. In practice however, it was found that traffic should be kept to a minimum to prevent excessive levels of carbon monoxide in dead pockets and cross current areas.

SEMINARS IN INDUSTRIAL HYGIENE AND TOXICOLOGY

Members of the technical staff have recently initiated a weekly lecture series within the Division in order to create a better opportunity for information exchange and the development of new perspectives. Because of the diversity of background and expertise among the Division staff members, a wide range of pertinent topics have been covered in detail. On occasion, outside speakers are also invited to speak. The general format for these talks, which are held on Wednesdays during the noon hour, has been lecture followed by discussion. A few of the topics covered to date have been: analytical methods for asbestos measurement; the problem of asbestos exposures in Massachusetts schools; toxicological effects of mercury compounds with emphasis on toxic renal responses; a view of health and safety from union perspectives; and problems in noise control.

DOH PRESENTS SEMINAR TO MASSACHUSETTS SAFETY COUNCIL

A seminar in occupational health was presented to the Supervisory and safety personnel members of the Massachusetts Safety Council as part of their program in continuing education in occupational safety and health.

The Director of the Division opened the program with an overview of the most important health problems in Massachusetts, and described the founding, organization and functions of the Division of Occupational Hygiene.

The Chief of Engineering Services discussed ASBESTOS, the problem in public schools, public buildings and industrial plants.

The Industrial Radiation Control Supervisor discussed the various types of radiation, evaluation of radiation hazards, protection and the control of radiation hazards in industry. Also, the Department's Industrial Bulletin #5 was reviewed in detail.

The Assistant Director discussed the lead hazard in industry. Its biological and medical aspects, and briefly reviewed the new federal lead standard..

The program was received well by the members of the Massachusetts Safety Council.

MICROWAVE HAZARDS DISCUSSED

Dr. Russell Carpenter, noted researcher on the ocular effects of microwave exposure, spoke to members of the New England Section of the American Industrial Hygiene Association at their dinner meeting.

Dr. Carpenter's experience with microwaves extends to the early days of microwave industrial utilization. The hazard from microwaves is due to their ability to abnormally heat living tissue. The most vulnerable organs he said are, the eyes. Dr. Carpenter reports that the use of microwaves for industrial and home use (microwave ovens) is rapidly increasing.

DOH HOLDS ASBESTOS CONFERENCE

Three officials from the State of New York visited the Division for two days to discuss our asbestos program, and see whether there may be any interstate cooperation on the common problems.

Mr. James Hurley, Asst. Director of Public Buildings Management, has many state buildings for which he expects to have to implement controls over the sprayed asbestos coatings. He has funding for the Dept. of Environmental Health for research on the problem. Mr. Samuel Syrotynski is the head of this research, and his funding allows him to do in-depth research on the many problems involving asbestos and its control.

Mr. Albert Relation, Supt. of Plant Utilities, has problems with the asbestos in boiler rooms. The state provided medical exams for 17 of the operating engineers which showed irregularities for 7 of the men. These 7 studies were sent to Dr. I. Selikoff, of Mt. Sinai Hospital, for review. He reported that 6 showed asbestosis. These studies have been sent to another agency for additional medical review. Afterwards it is planned to study all of the operating engineers working for state facilities.

Mr. Syrotynski has a more extensive research program, but has

not been involved in field surveys to any extent as yet. He is in agreement that there is a significant problem with work contracts in performance specs. Another area where there exists a problem is with the specifications for encapsulating paints. No adequate specifications exist, although EPA has funded research, and there are many companies selling and making great claims for their products.

The second day was given over to visiting six different jobsites around Boston where asbestos control jobs were being performed, in progress, or to discuss those control jobs to be undertaken in the near future.

POLARIZED MICROSCOPY COURSE

The Asbestos Commission staff and a DOH Senior Engineer attended the recent asbestos identification course held at the FDA laboratory on Commercial Street, in Boston.

This course, conducted by Dr. Walter McCrone, of McCrone Associates, a recognized expert microscopist, was sponsored by the EPA and covered basic theory of polarized light, optical crystallography, optics, and the application of these principles to identifying asbestos and other materials contained in insulation products.

The course was attended by a total of 17 representatives of federal, state and local agencies throughout New England.

PROTECTIVE EQUIPMENT SEMINAR

A seminar on Eye, Head, Face and Hearing Protection was given at the Division by technical representatives from the Safety Products Division of the Norton Company. This very informative meeting covered many of the in-depth technical details involved in the development,

testing, evaluation of the effectiveness in the field and specific application of the following products: Helmets, goggles, face shields, safety glasses, welding goggles and helmets, ear muffs and plugs. Much of the information gained at this meeting will be directly useful during the field industrial hygiene surveys performed by the staff.

This lecture program is part of the D.O.H. in-house training program.

DEPARTMENT POLICY CONFERENCE

The D.O.H. 7(c)(1) Health Consultant staff attended an administrative conference at the Mine Safety and Health Administration office in West Newton.

The intent of the conference was to outline the policies, projects, programs, and goals of the Department of Labor and Industries new administration.

The Health Consultants attended a workshop in the morning. This workshop was attended by the ten Safety Consultants from the six regional offices of the Division of Industrial Safety. The major topic of conversation was the content and provisions of the newly-signed 7(c)(1) contract with the Federal Department of Labor.

D.O.H. APPLIES FOR ASBESTOS GRANTS

The Division has recently applied for grant money available from the U.S. Department of Health, Education, and Welfare.

In resppnse to the request for applications, the Division of Occupational Hygiene submitted two separate grant proposal packages; one proposal designed to develop and evaluate new procedures for the safe removal or containment of friable asbestos, and another proposal designed to develop a demonstration program for information about safe

asbestos removal. The total funding for the two grants is estimated at over $700,000.

These two grant proposals were signed and submitted to HEW's National Institutes of Health on November 29, by the Commissioner of the Department of Labor & Industries.

Review of the proposals is scheduled to be completed by April of 1980.

ALL DAY TECHNICAL CONFERENCE

The Annual Meeting of the New England Section of the American Industrial Hygiene Association was attended by several staff members and the Director.

This technical conference had as its theme, "Control Strategies for Occupational Exposures". Former DOH staff members and our present Occupational Hygiene Physician presented papers on controlling occupational disease in the workplace. Such subjects as ventilation standards, recirculation of exhaust air, respiratory protection, medical surveillance and the legal aspects of these control strategies were discussed in detail.

The luncheon speaker was Dr. Donald McFee, President of the National American Industrial Hygiene Association. He discussed the impact of OSHA regulations upon small industries.

WORKSHOP FOR GRANTS AND PROPOSALS

the Assistant Director and the Project Director of the Asbestos Commission Program attended a workshop presented by the New England School Development Council on Grant Development and Proposal Writing.

The program was designed to assist individuals whose functions at times include writing Federal Grant Proposals. Our Division recently prepared two such proposals. The workshop training clearly delineated the mechanics of Grant writing and should make the job easier when the Division applies for another Grant.

ASBESTOS COMMISSION MEETING

This latest meeting of the Special Legislative Commission on Asbestos was attended by the Asbestos Program staff, the Director, and the Assistant Director, Assistant Commissioner of the Department of Labor and Industries, the School Building Assistance Director,and was chaired by Senator Robert McCarthy.

Major points discussed were a plan for reimbursement of public schools having asbestos removed, the need for a regulatory agency concerning asbestos contractors and the formation of a subcommittee to establish that agency, ongoing public building survey work, and current grant proposals. The subcommittee meeting date was set for January, 1980.

NEW LEAD STANDARD DISCUSSED

At the invitation of the Independent Garage Owners of Massachusetts a presentation and informal discussion was given by our DOH Senior engineer on the new OSHA Lead Standard. Approximately seventy members of this association were present for this meeting.

The presentation covered the toxicological properties of lead as well as the legal requirements of the standard. The specific requirements for air and biological monitoring were emphasized.

The services of this Division, in particular the 7(c)(1) Program and the free blood-lead analysis were emphasized as well as the

confidentiality of our consultations.

TSCA CONFERENCE

Personnel from the Division, including the Director, Assistant Director, and two industrial hygienists attended a seminar entitled "An In-Depth Look at the Toxic Substances Control Act" co-sponsored by four professional organizations including the Mass. Safety Council. Three speakers discussed the TSCA from their respective areas of concern and expertise.

Dr. Douglas Bannerman, the EPA industrial liaison chief with TSCA spoke on where the EPA stands on TSCA including recent developments and TSCA goals.

Dr. Walter Harris, corporate industrial toxicologist with Uniroyal, Inc., discussed the ramifications of TSCA from the perspective of private industry.

The third speaker, an attorney from the National Resources Defense Council, discussed motivating factors behind TSCA from the legal and pragmatic standpoints.

STAFF MEMBER INVITED TO SPEAK AT MT. SINAI HOSPITAL SYMPOSIUM ON ASBESTOS

The Asbestos Program director was invited to speak in New York at Mt. Sinai Hospital on the Division's experience with asbestos in public schools and public buildings in Massachusetts. Details of the study including procedures used, results obtained, and recommendations made were described. The meeting was attended by the most prominent researchers studying asbestos exposure.

TRAINING SESSION BY STAFF MEMBERS

The Chief of Engineering Services and Senior Chemist presented talks at a training session held at the West Newton Training Center. Subjects

discussed were: techniques for evaluating environmental exposures to toxic substances, and Asbestos in public schools. Their participation was part of an all day training session for Industrial Safety Inspectors.

MPHA OCCUPATIONAL HEALTH CONFERENCE

Members of the staff of the Division of Occupational Hygiene attended the MPHA seminar entitled "Occupational Health in Massachusetts--Crucial Issues".

The morning session concerned itself with respiratory disease of an occupational origin.

Ms. Nancy Sprince, M.D., a respiratory specialist from Massachusetts General Hospital discussed:

Byssinosis--A disease occurring in workers exposed to cotton dust. The specific contaminant is a chemical agent, located in the leaf surrounding the stem of the cotton boll. This agent is borne in the dust particles and when inhaled, causes constriction of the small airways. Because the disease affects the function of the lung, rather than causing a specific change in the structure, it is not diagnosable by X-ray. Diagnosis is based on the occupational history and measurements of diminished lung function tests during exposure.

In asbestosis, the asbestos fibers that escape the cleaning mechanism of the upper respiratory system, lodge in the bronchioles and set up an irritation that leads to the formation of scar tissue. Asbestosis is characterized as a fibrotic pulmonary disease. In relatively recent years, asbestos had been linked with bronchial carcinoma and with mesothelioma, the rare cancer of the membrane lining the pleura and peritoneum.

Prevention is the best safeguard against asbestosis and other asbestos linked problems.

Dr. Sprince and Dr. David Wegman emphasized the importance of c complete work history. Massaachusetts General Hospital is presently evaluating their records to determine the type of history that was taken on admission.

Key 1 = Poor
2 = Partial history (last job only)
3 = Fair
4 = Detailed and complete

Dr. Wegman offered the following:

Steps Toward Prevention of Occupational Disease

1. Discover the presence of a new disease.
2. Take an adequate history.

   Include these questions;
   *What were the two major jobs you had in your lifetime:
   *What did you do on your job: Describe the activities you performed.

3. Listen to the worker. What do you think caused your illness?
4. Substitute alternate materials for hazardous substances.
5. Educate management re workers complaints (they may be right.).
6. Educate workers about the hazards of the workplace.
7. Institute mortality and morbidity studies.
8. Develop additions to the law, such as worker inspectors. Give these workers the authority to function.

Since most accidents occur to workers between the ages of 18 and 25, the importance of early safety and health education was stressed. The DOH Director stated that the Division of Occupational Hygiene had

contemplated developing such a program to introduce into vocational schools, colleges, and apprenticeship curriculums prior to the entry of young people into the work force.

ASBESTOS COMMISSION MEETING

At its regular meeting the Asbestos Commission staff distributed a progress report outlining the major activities of the staff since the last commission meeting in December, 1979.

The public building surveys were discussed as the first order of business. Substantial advancement in this phase of the commission's work has been made. March 28, 1980, was accepted as the completion date for survey work in the state's colleges and universities.

Draft regulations for asbestos control were discussed and taken under advisement.

An update on the reimbursement program for schools involved in asbestos abatement projects was delivered by the Department of Education. A feasibility study into electron microscopy air sampling was supported by the commission members.

RESPIRATORY PROTECTION SEMINAR

As part of the on-going training seminar series sponsored by the Division, representatives of the Norton Company, one of the major manufacturers of respiratory protective equipment, presented a one day seminar on all aspects of what a comprehensive respiratory program should be. This seminar included: diverse technical aspects of the different types of respiratory protection available on the market today; how these devices are currently being tested for their effectiveness by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) for certification

purposes; a detailed description of what aspects a proper in-plant respiratory program should include and which of these aspects are required by OSHA regulation; the criteria for respiratory selection, and an extensive explanation of what is required to comply with the quantitative fit-testing for respiratory devices which is required of employees by OSHA as of March 1, 1980.

A NEW METHOD FOR DISPOSAL OF ASBESTOS

Representatives of a number of federal and state agencies, including this Division met at the Pyro-Magnetics Corporation in Whitman to watch a demonstration of waste conversion which should be of considerable value in solving the problem of disposal of solid wastes, such as asbestos.

Introduction of the waste asbestos into a special induction furnace containing molten iron results in a thermal phase reaction on the surface of the molten iron converting the solid material to a liquid glass. This material is run off as slag into a water quench. The crystalline asbestos structure is destroyed and the material becomes amorphous - no longer asbestos.

This glass - like slag may be converted by a special process into a mineral wool-type substance for reuse, or the slag may be disposed of as a non-hazardous material.

HAZARDOUS WASTES PRESENT HEALTH PROBLEMS

Several staff members of this Division attended a meeting of the New England Section, American Industrial Hygiene Association to hear a representative of U.S. Environmental Protection Agency, Waste Management Branch present a talk on "Hazardous Wastes in New England - the

Problems and Solutions."

Occupational exposures may result and create a health hazard to workers engaged in the disposal of hazardous waste.

The illustrated talk was well received by our staff members and other members of the Association.

SOMERVILLE CHEMICAL SPILL

Observations were made of operating procedures among firemen and others during the clean-up of phosphorus trichloride released from a ruptured railroad tank car. The nature of this highly corrosive chemical was such that the addition of water would generate fumes of hydrogen chloride gas and phosphoric acid.

Pits were dug to prevent the liquid chemical from running down storm and sewer drains. Tank trucks were brought in to drain the tank car and the pits. The remaining residue and saturated ground was covered with dirt and sand saturated with water, ending the crisis.

Firemen and others closest to the spill wore Scott Air Pak respirators which are appropriate for this situation. Most of these workers wore protective clothing, unfortunately few had their hands, head and neck areas covered resulting in skin burns and irritation in those areas.

Fire crews should be educated on the general hazards of chemical spills and should be given reference materials on specific hazards of specific chemicals. Information should be gathered on specific potentialhazards in local districts and transporters required to have readily available hazard information about their cargoes. Telephone numbers of local and national emergency response teams and information lines need to be known and available.

Firemen when approaching spills of unknown hazards should anticipate the worst and have available as a minimum self-contained respirators. Additional protective equipment and clothing should be readily available.

ASBESTOS SEMINAR AT UNIVERSITY OF MASS. MEDICAL CENTER

Since Dr. I. Selikoff of Mt. Sinai School of Medicine, New York could not appear at a proposed seminar, Dr. Barry Levy of the University of Massachusetts Medical Center and sponsor of the seminar, requested the attending state and federal representatives to act as a panel, and duscuss the various programs sponsored by the individual agencies. The Director of DOH addressed the attendees on the development, functions and accomplishments of the Special Legislative Commission on Asbestos in Massachusetts.

SOLID WASTE MANAGEMENT SEMINAR

The Director of the Division of Occupational Hygiene attended a seminar sponsored by the National Solid Wastes Management Association on the latest trends and developments in the solid and hazardous waste management field.

The Director addressed the group on the costs involved in safety and health programs, the institution of effective programs and the sources of safety and health problems.

INDUSTRIAL HYGIENE SHORT COURSE

The Harvard School of Public Health recently conducted a short course to review general industrial hygiene principles.

The project engineer for the Asbestos Commission attended. The course met for a full week, from March 24, - March 28, and consisted of

four hours of classwork each morning, and four hours of laboratory work each afternoon. Several disciplines involved in industrial hygiene were discussed. Highlights included lectures and demonstrations on personal protective equipment, radiation sampling, carcinogen control and ventilation assessment.

The faculty for the course was comprised of several members of the Harvard School of Public Health faculty including a toxicologist, an occupational health physician, a dermatologist, and an air pollution engineer. Representatives from local companies, including Polaroid and Liberty Mutual, provided lectures on real world industrial hygiene problems.

A COUNTY PRISON ASBESTOS EXPOSURE

A representative from the Division of Community Sanitation surveyed the Essex County House of Correction and Jail in Lawrence and noticed a potential health hazard resulting from poor asbestos and pipe lagging. The Division of Occupational Hygiene was called in to conduct an investigation of the prison.

The survey revealed that there was an easily accessible pipe with exposed asbestos. The pipe covering had been torn. Another covering and a plywood enclosure of the pipe was recommended. Overhead pipes in the dining room were also in poor condition. Since they were not as accessible as the other pipe, another covering over the pipes would be sufficient.

ASBESTOS COMMISSION DISCUSSES ASBESTOS DISEASES

Members of the Special Legislative Commission on Asbestos met on Wednesday, April 30, in the State House.

The focus of the meeting was a narrative and slide show to review the history of the asbestos medical literature presented by Dr. Raymond Murphy, a member of the Commission. The need for some central registry in Massachusetts for asbestos diseases, especially mesothelioma, was stressed. Senator McCarthy mentioned that there is a bill pending in the legislature to set up a central tumor registry. The meeting concluded with plans to acquire additional information on the cancer registry bill.

AMERICAN INDUSTRIAL HYGIENE CONFERENCE

The Director of the Division of Occupational Hygiene attended the annual American Industrial Hygiene Conference in Houston, Texas. The Assistant Director of this Division sponsored by the American Conference of Governmental Industrial Hygienists attended this conference to present a report to the prestigious Threshold Limit Values Committee, of which he is the recording Secretary.

More than 350 technical papers were presented at concurrent sessions by experts from several foreign countries in addition to the United States. The Conference was attended by engineers, doctors, chemists, nurses, and educators who are concerned with the many disciplines involved in occupational health and industrial hygiene.

OFFICIAL AGENCIES DISCUSS BRIDGE LEAD PROBLEM

This meeting was held at the request of the Boston Air Pollution Control Commission. The purpose was to discuss the abrasive blasting operations being done on the Tobin Bridge by the George Campbell Painting Company for Massport and to determine if their permit to blast should be revoked.

Public Health brought a letter from the Public Health Assistant Commissioner for Environmental Health stating that the blasting operation should be stopped immediately. They based their decision on air sampling done by D.E.Q.E. and observations by their representative that improvements can be made in dust containment. The letter is addressed to Eugenie Beal, the Executive Director of the Boston Air Pollution Control Commission.

D.E.Q.E. disagreed with D.P.H. on their action. D.E.Q.E. feels that more sampling during blasting is advisable. Their preliminary results released at this meeting by D.P.H. showed levels as high as 16 ug/m^3 Pb in a 6 hour sampling period.

D.E.Q.E. has set up a meeting for all parties concerned at 4 p.m. Monday, July 7, at 600 Washington Street, Room 320. The object of their meeting is to discuss further plans to sample and monitor blasting, and to attempt to coordinate through one agency.

The representatives from the Boston Lead Poisoning Prevention Center stated that of three children close to the current blasting area, two had elevated blood lead levels. It was pointed out in discussion that this information can not be used to indicate if the blasting operation is a problem or not.

There was concern expressed by the representative of the Boston Conservation Commission about the leaded paint removal on the spans over water. Wet blasting is being considered. The final discussion on this point seemed to indicate approval under certain weather contitions and control procedures.

The main topic discussed was whether blasting should be allowed to continue. D.P.H. and D.E.Q.E. both strongly advised bringing in

outside ventilation engineering consultants to find ways to improve the blasting enclosures. Massport felt it would be weeks. The original design consultant is not available. Improvement of the current design was discussed.

The main problem is the escape of blasts through 3 inch gaps where sheds meet the underside of the bridge. The George Campbell Painting Company representative stated that heavy duty rubber flaps to deal with this problem have been installed in blasting sheds that will be hung on the bridge in the future.

In view of this information, it was concluded that blasting should be allowed if there is observable improvement. Representatives of D.P.H. and D.E.Q. will be at the site for this immediate determination. If the blasting is allowed, further sampling will be conducted to evaluate the improvement.

CHEMICAL ACTIVITIES

AMMONIA POISONING INCIDENT

An investigation was made of an accidental exposure to ammonia which occurred during the removal of supposedly empty 55 gallon drums from a lot. The person who was engaged in the removal suffered intense and immediate eye and nasal irritation when one of the drums he was moving suddenly ruptured. More serious health effects had their sudden onset eight hours after the initial exposure. The person was admitted to the hospital with severe shortness of breath; wheezing; nausea, and headache. The attending physician, suspicious that these symptoms had been brought on by the patient's occupational exposure earlier in the day, requested an investigation by this Division to determine the

chemical nature of the exposure.

Upon site inspection and numerous environmental tests it was determined that ammonia was the chemical responsible for the accidental exposure. The company, by which the patient is employed, is in the scrap metal business, and had purchased the 55 gallon drums for the purpose of metal reclamation. Therefore, it was not expected that these drums would be filled with appreciable amounts of toxic chemicals.

After five days the patient was able to leave the hospital. Recommendations for respiratory protection and appropriate clothing materials to be worn during the completion of the removal process were issued to the company by this Division.

EVALUATION OF A POTENTIAL LEAD HAZARD

At the Boston University Goldman School of Graduate Dentistry, the Endodontics Department uses specialized instrument sterilizers. Each of ten rooms in the department is equipped with an Esquire Hot Bead Sterilizer. The small files and drills used in root canal procedures must be sterile. They are made germ-free by soaking in a small heated pot of molten lead-tin solder, kept at 450°F. The limiting temperature is determined by the metallurgy of the dental instruments. A higher temperature would cause the alloy to lose its temper and become brittle. The DOH survey found that no special exhaust ventilation is used or required because at the operating temperature the lead-tin solder becomes liquid but does not generate fumes into the air.

DOH ASSISTS DIS INSPECTORS IN TRAINING PROGRAM

The Assistant Director presented lectures to the industrial inspectors of the Division of Industrial Safety on laboratory health and safety

and the health and safety hazards in quarries and mines at the Training Resource Center of the Mass. Division of Industrial Safety.

The lectures covered pertinent safety and health exposures which may be encountered by the DIS inspectors during their investigative visits to school laboratories and to open pit mines and quarries.

NEW EQUIPMENT UPDATES BLOOD TESTS

The D.O.H. laboratory recently purchased a HEMATOFLUOROMETER to measure the zinc protoporphyrin in the blood of workers exposed to lead. This test is a requirement of the federal (OSHA) standard along with the test for lead in the blood, and indicates body dysfunction resulting from lead absorption by the exposed workers. The test uses the same blood sample which is sent to the D.O.H. laboratory for lead-in-blood determination. At present, development work is being performed to determine what findings represent body dysfuntion vs. lead-in-blood determinations.

COMPREHENSIVE LEAD SEMINAR

Staff members attended a special all day seminar on lead sponsored by the Associated Industries of Massachusetts to hear a discussion of the new Federal lead Standard, and its application. Various elements of this standard are discussed below:

1. Health Effect

Lead exposure profoundly affects the health of workers and frequently that of their families. Children of lead workers have higher blood levels than other children in their neighborhood. Good hygiene with showers and change of clothing is essential.

Inhalation and ingestion of lead results in damage to the nervous, urinary and reproductive systems, and inhibits synthesis of the molecule

heme which is responsible for O_2 transport in humans.

Acute mild effects - Inhibition of enzyme activity, reduction of motor nerve conduction velocity, behavioral changes and central nervous symptoms damage.

Permanent damage to the body, chronic disease and death.

To prevent further adverse health effects, blood level must be maintained at or below 40 micrograms of lead per 100 grams.

Lead is stored in the bone. After prolonged exposure, the blood level may be the same but the Total Body Burden in the bone will be greater.

It takes 11 years by normal attrition (no exposure) to lower the T.B.B. by ½.

Symptoms

(a) Heme - inhibits synthesis of heme molecule which is responsible for transport of O_2.

(b) Biosynthesis - Enzyme effects measured - sometimes disrupted.

(c) Neuro - Mood changes, convulsions coma, respiratory cessation.

Peripheral nerve - muscles of arms and legs affected - wrist drops - fine motor movements affected.

Cranial nerves - ataxia.

(d) Renal - damage to the nephron (waste removal). There is a decrease in the glomerural filtration rate. B.U.N. and Creatinine before these tests show an abnormality, 2/3 of the kidney has been damaged.

(e) Reproduction - Men and women.

Increase in stillbirths and abortions. Fetus has same blood lead level as mother. Child more sensitive: adverse central nervou effects.

Male - Affect reproduction of germ cell. (Controversial). Male sperm may be abnormal, effects structure and viability of sperm.

(f) Mortality

Deaths from

High blood pressure { probably due to nephron damage
Renal disease

II. Permissible Exposure Limit (P.E.L.)

(a) (P.E.L.)
50 micrograms per cubic meter of air.

(b) Action Level*

30 micrograms per cubic meter of air.

*Point at which OSHA says protective measures must be taken.

III Medical Examination

Biological - Blood monitoring every six months when lead exceeds action level, every 2 months when blood level exceeds 40 micrograms of blood, monthly during removal from job for excessive exposure.

Employees must be notified of results.

Medical Examination - specified according to standard to include:

(a) Detailed work history and medical history.

(b) Thorough physical - particular attention to teeth, gums, hematologic, gastrointestinal, cardiovascular, neurologic and renal systems. Pulmonary status evaluated.

(c) Blood pressure.

(d) Blood work - 1) Blood lead, 2)Hemoglobin and hematocrit 3) Zinc protoporphyrin 4) Blood urea nitrogen 5) Serum creatinine

(e) Urinalysis and microscopic exam.

IV. Medical Removal

V. Treatment Considerations

- Chelation is a potentially dangerous treatment. Chelating drugs are used only in unusual circumstances and not as a general control for lead exposure.

The drugs can cause chemical inbalance in body of other metals - damage to nerves, blood, and kidneys.

Can be effective in acute short exposure - not in prolonged exposure because of T.B.B.

UNIVERSITY CHEMICAL LABORATORIES SURVEYED

At the request of the school management, a visit was made to Southeastern Massachusetts University as a follow-up of our investigation of the laboratory fire and explosion that caused the death of a student-employee, last June. All of the chemical laboratories were surveyed for health and safety hazards. General ventilation in some laboratories was found to be inadequate. The local exhaust ventilation in nearly all the laboratory hoods tested was below standard. Chemical storage particularly in the main supply room and the organic laboratory was poor. Recommendations were made to correct the deficiencies found as a result of this visit.

LEGIONNAIRES' DISEASE

A complaint was received from an employee responsible for maintenance of a cooling tower where the Legionnaire's disease organism had been isolated during the summer. The cooling tower water was disinfected and flushed at that time. In the cooler months, the likelihood of recurrence of the organism is very slight. However, recommendations and precautions were made to eliminate any chance of contact with the

cooling tower water by the use of protective clothing and respirators. Periodic water sampling will be instituted during the warmer months.

HEALTH AND SAFETY HAZARDS IN THE ARTS

An all day conference covering health hazards of art materials was attended by four members of this Division. This conference was hosted by the Mass. College of Art. Dr. Michael McCann and Monna Rossol were the two speakers at the workshop sessions.

Workshop topics covered were: 1) Ceramics 2) Painting 3) Sculpture 4) textiles. Members of this Division went to all four workshops and attended the lectures on general toxicology and control equipment. The workshops treated the health hazards of their subject areas in great detail. In particular: Ceramics (by Ms. Rossol) covered hazards faced in glass-blowing, enameling and stained-glass painting (by Mr. McCann) treated printing making plastics and wood-working dangers; Sculpture (Ms. Rossol) covered stone, metalcasting, foundry and welding and the textile workshop treated fiber, photography and jewelry dangers.

The workshops presented a great deal of information not readily available through the standard industrial hygiene publications, and in addition indicated to the DOH staff the general low level of health education among artists.

LABORATORY TRAINING COURSE

The OSHA On-Site Consultation Program held a training course on the laboratory services for sample analysis. One of the Health Consultants attended the course in Madison, Wisconsin. The program described all the procedures for sample handling, analysis, and reporting. The service is for the 7(c)(1) Consultation Programs in the country.

We use the services only for silica analysis, as our X-Ray diffraction equipment is obsolete, and a substitute method has not been

established. In general, the facilities of the Wisconsin laboratory are more extensive than ours, but we can do all the required analyses except silica at the present time.

EXPOSURES TO ANESTHETIC GASES IN MEDICAL AND DENTAL OPERATORIES

Adverse health effects, including mutagenic and systemic, have been reported in operating room personnel exposed to anesthetic gases, particularly the commonly used nitrous oxide.

One of the Division's Senior Chemists was assigned the task of initiating a study of this problem in Massachusetts. NIOSH has generously loaned the Division specialized field sampling and analytical equipment for about two months to carry out this project. So far testing has been performed in a number of hospitals and dental offices. Concentrations of Nitrous Oxide have been found to exceed the NIOSH 25ppm recommended standard in a fair number of operatories. In most instances these operatories were not equipped with recommended ventilation and scavenging systems. The allowed survey period is too short for an in-depth study, but a study of the preliminary data will determine the future course of this study. The Division expects to purchase the required equipment after July, 1980. The study will resume at this time if the preliminary survey warrants it.

DENTISTS INFORMED OF MERCURY HAZARD

One of the Division's Health Consultants addressed the Hampshire District Dental Society at the Hotel Northampton in Northampton. The oral presentation focused on various aspects of mercury use in the dental operatory. Documented case studies of mercury poisoning among dental personnel were discussed in the context of acute, sub-acute, and chronic exposures. The signs and symptoms of chronic exposures were discussed at length. Mercury's absorption, distribution, and excretion routes and rates in the human body were detailed. The biochemical and

physiological mechanisms of toxicity for mercury were explained. The methodology used by the Division of Occupational Hygiene for monitoring mercury contamination in the dental operatory was outlined. A considerable amount of time was spent discussing the primary sources for mercury contamination and the controls necessary to reduce or eliminate these sources of contamination.

ARTS AND CRAFTS HEALTH HAZARDS PRESENTATION

As part of the seminar "The Concern for Low Level Exposures to Toxic Materials", the Division's Assistant Chemist presented a discussion, "Health Hazards in the Arts and Crafts" at the annual meeting of the Massachusetts Safety Council. Until recently, this particular hazard field has not received widespread attention in terms of the potential health hazards which may be encountered by the uninformed. Approximately 78.5 million persons participate in some type of art and crafts, and one-half million are professionally employed in these fields on a full-time basis.

There are many solvents, acids, heavy metal pigments, plastics, and material producing fibrogenic dusts contained in artist's materials. Working conditions may vary tremendously among artists depending on hygiene and housekeeping, use of protective equipment and the presence and use of exhaust ventilation.

PLANT EMPLOYEES AFFECTED BY CHEMICAL SPILL

Subsequent to the phosphorous trichloride spill in Somerville, several employees of a printing shop located near the spill area were tested by local hospitals. Some of these employees had unusual test results, even after a second and third screening. The Division's doctor and Chemist visited the print shop to determine if these test results were due to the phosphorous trichloride exposure, occupational exposure in the print shop, or the patients' prior medical history. Employee medical histories were obtained as well as several air samples in this joint effort to determine the source, if any, of the employee health problems. This problem is still under investigation.

LABORATORY ACCIDENT CAUSES EVACUATION

The Division was requested to investigate an accidental exposure to chemical fumes. The incident occurred in a chemical laboratory when strong irritant fumes were generated from a sample containing ammonium phosphate was excited electrically for analysis and escaped into the room because of a breakdown in the local exhaust system. It was feared that toxic gases including phosphine, ozone and ammonia were present. Laboratory personnel were evacuated and sent to the hospital for observation. No serious effects were found.

Tests were made by this Division for all of the toxic gases mentioned but they were absent. The ventilation system was put back into operation. No further problems are expected.

MEDICAL AND NURSING ACTIVITIES

MULTI-PLAN HEALTH SYSTEMS

The Division's nurse noted the surge of multi-plan Health systems that have developed since OSHA Act of 1970 was passed. They are supposed to meet the need for specific medical surveillance for particular hazards. She is not sure that these systems meet this need. There appears to be no control over the activities of these health systems. No guidelines exist to determine what medical surveillance is required for a specific exposure hazard (assuming that a hazard has been identified). No criteria have been developed to determine the qualifications of those administering the health systems. Some of the services provided already exist in some industrial plants, and therefore, a duplication of effort occurs. A recommendation is made that a bulletin be prepared to address the whole subject of Multi-Plan Health Systems in industry and how they should be properly designed to interface with existing industrial medical program.

LEGALITY OF NURSES WORKING UNDER GENERAL MEDICAL ORDERS STUDIED

The Division's nurse studied the legality of industrial nurses administering treatment and giving medication under general medical orders of a physician.

Contact was made with Boards of Registration in Nursing, Pharmacy, and Medicine. While Massachusetts General Laws, Chapter 12, Section 80B, covers the administration of treatment or medicine it does not appear to include the occupational health nurse working under general orders with a general population.

Nurses, therefore, in these circumstances, it is believed, are working under their own licenses and, therefore, are legally responsible in their professional action. The problem needs to be resolved. A combined meeting of the Three Boards may be necessary to precisely define the legality of the issue.

MASSACHUSETTS SAFETY AND HEALTH CONFERENCE

The Occupational Health Nurses section of the Massachusetts Safety and Health Conference was attended by the nurse supervisor, who presented a lecture on "Evaluating the Effectiveness of Nursing Service in the Occupational Health Setting."

An overview of the nurse supervisor role as the occupational health nursing consultant with the Division of Occupational Hygiene was given. It illustrated her accessibility to employers and to individuals (in the Commonwealth) who are concerned with the prevention of occupational disease and injury.

A brief summary of the services provided by the nursing consultant follows:

> Assist top management in evaluating the need for instituting an occupational health service, and assist in determining the type of service that is best suited to their needs.
>
> Cooperation with top management in establishing and maintaining and expanding preventive health services.
>
> Recommendations to management on the design of the medical department, the location, and the layout, equipment and supplies for health services.

Orientation of Occupational Nurses by assisting them in the developing and carrying out broad preventive health programs.

Consultations with occupational health nurses relative to hazardous materials and conditions which may be present. Assist in defining their role in terms of environmental testing, personal protection, medical and biological monitoring and emergency procedures for adverse reactions.

SOURCES OF INQUIRY

Source	Services	Information	Total
Division of Industrial Safety	57	2	59
Follow-up	12	--	12
Radiation Surveys	176	--	176
Self-Initiated	49	--	49
Employer	126	154	280
Labor Union - Employees	117	15	132
Government	86	80	166
Physicians-Hospitals	40	20	60
Dentists	91	1	92
Nurse	1	4	5
Consultants-Contractor	32	38	70
Research	--	1	1
Schools	81	49	130
Professional Organization	2	2	4
Non-Prof. Organization	6	12	18
Insurance	1	12	13
Non-Official Agency	1	6	7
Attorneys	3	14	17
OSHA	1	--	1
Communications	1	5	6
Publisher	1	14	15
Public Utility	3	6	9
Libraries	1	4	5
Tenants, Citizens, etc.	12	55	67
	900	494	1394
Out of State Requests	3	51	54

FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONS

SUMMARY BREAKDOWN

Classification	Different Types	Investigations (750)
A. Chemicals		
Solvents	49	243
Metals	12	259
Gases	19	206
Other		
Acids	6	8
Fumes, Mists, Smoke, etc.	6	34
B. Dusts	13	(390)
C. Physical Hazards		
Noise		(62)
Radiation		(142)
Radioactivity		90
X-Radiation		43
Microwaves		7
Lasers		2
Heat Stress, Humidity		(8)
Illumination		(6)
Ventilation		(121)
Air Quality		(13)
D. Infections and Diseases, N.O.C.		(5)
Dermatitis		2
Legionnaires' Disease		2
Psittacosis		1
	TOTAL INVESTIGATIONS	1497

FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONS

HARMFUL SUBSTANCES AND CONDITIONS

Acetic Acid	1
Acetone	13
Acids, N.O.C.	1
Acrylonitrile	1
Air Quality	13
Ammonia	9
Amyl Acetate	3
Amyl Alcohol	1
Anesthetic Gases, N.O.C.	3
Arsine	1
Asbestos	310
Benzene	4
Beryllium	2
Bromine	1
Butyl Acetate	2
Butyl Cellosolve	2
Cadmium	3
Carbon Dioxide	19
Carbon Monoxide	54
Cellosolve	3
Cellosolve Acetate	2
Chlorine	4
Cobalt	4
Chromic Acid	1
Chromium	1
Combustible Gases, N.O.C.	5
Copper	6
Cotton	3
Cyanide	3
Dermatitis	2
Diisobutyl Ketone	1
Dust, N.O.C.	47
Epichlorohydrin	2
Epoxy N.O.C	1
Ethyl Acetate	2
Ethyl Alcohol	4
Ethyl Benzene	1
Ethyl Ether	1
Ethylene Glycol	1
Ethylene Oxide	1
Fibrous Glass	3
Fluoride	4
Formaldehyde	20
Freon, N.O.C.	4
Fumes, N.O.C	1
Gasoline	1

Halothane	2
Heat Stress	4
Heptane	2
Hexane	2
Humidity	4
Hydrogen Chloride	4
Hydrogen Sulfide	6
Illumination	6
Iron	13
Isocyanates, N.O.C.	2
Isophorone	1
Isopropyl Alcohol	12
Kerosene	1
Lead	82
Legionnaires' Disease	2
Lithium Aluminum Hydride	1
Mercury	129
Methane	7
Methanol	10
Methyl Butyl Ketone	1
Methyl Cellosolve	1
Methyl Cellosolve Acetate	1
Methyl Chloroform	6
Methylene Chloride	9
Methyl Ethyl Ketone	12
Methyl Isobutyl Ketone	9
Microwaves	5
Mineral Spirits	5
Naphtha	7
Nickel	7
Nitrogen Dioxide	12
Nitrous Oxide	16
Noise	62
Odors, N.O.C.	3
Oil Mist	8
Organic Vapors, N.O.C.	6
Ozone	17
Perchloric Acid	1
Perchloroethylene	21
Pesticides, N.O.C.	2
Petroleum Distillate	2
Phosgene	3
Phosphine	3
Phosphoric Acid	1
Pollen, N.O.C.	1
Propyl Acetate	1
Propyl Alcohol	2
Psittacosis	1

Radioactivity	184
Silica	19
Silicone	1
Silver	3
Smoke	4
Styrene	8
Sulfur Dioxide	9
Sulfuric Acid	3
Terpenes	1
Thorium	1
Tin	4
Titanium Dioxide	1
Toluene	30
Toluene Diisocyanate	6
Trichloroethylene	10
Trichlorotrifluoroethane	4
Trimellitic Anhydride	2
Turpentine	1
Ventilation	121
Vinyl Chloride	5
Welding Fumes, N.O.C.	1
Wood Dust	2
X-radiation	84
Xylene	22
Zinc	11
Zinc Stearate	1

CLASSIFIED BY ACTIVITIES

Medical Consultations	89
Nursing Consultations	70
Meetings	240
Talks	24

INFORMATION REQUESTS

Safe Practice Bulletins (Complete Sets)	124
Safe Practice Bulletins (Singles)	725
Annual Reports	79
Industrial Bulletins	47
Special Bulletins	30

FIELD WORK

SECTION	PLANT VISITS	OTHER VISITS	TALKS	MEETINGS
Director	2	37	4	37
Assistant Director	10	49	6	45
Engineers	912	118	8	110
Chemists	230	49	1	32
Physician	7	24	2	4
Nurse	50	19	3	12
	1211	296	24	240

RECOMMENDATIONS MADE

TYPE		NUMBER	WORKERS AFFECTED
Environmental		2021	10,852
Health		227	34,246
	Total	2248	45,098

RECOMMENDATIONS COMPLETED

TYPE		NUMBER	WORKERS AFFECTED
Environmental		208	1584
Health Services		17	3371
	Total	225	4955

ENVIRONMENTAL TESTS

Substance or Condition	NUMBER	IN HARMFUL EXPOSURE RANGE
PHYSICAL HAZARDS		
Radiation		
Radioactivity	2755	78
X-Radiation	1004	55
Microwaves	170	8
Noise	1065	338
Ventilation	974	341
Illumination	78	38
Heat Stress	19	0
Humidity	3	0
CHEMICAL HAZARDS		
Acetic Acid	2	0
Acetone	3	0
Ammonia	17	0
Arsine	3	0
Bromine	2	0
Carbon Dioxide	32	0
Carbon Monoxide	438	80
Chlorine	4	0
Combustible Gases, N.O.C.	24	0
Cyanide	3	0
Ethylene Oxide	5	0

Formaldehyde	13	0
Hydrogen Chloride	8	0
Hydrogen Sulfide	11	0
Isopropyl Alcohol	2	2
Mercury	2942	554
Methane	13	0
Methanol	1	0
Methyl Chloroform	1	0
Nitrogen Dioxide	30	0
Nitrous Oxide	409	145
Ozone	12	0
Perchloroethylene	11	0
Petroleum Distillate	1	0
Phosgene	4	0
Phosphine	5	0
Smoke	4	0
Sulfur Dioxide	19	0
Toluene	12	0
Trichloroethylene	5	0
Total	10,091	1639

AIR SAMPLES COLLECTED

1. PARTICULATES

Substance	Number	Number in Harmful Range
Asbestos	291	23
Cotton	1	0
Dust, N.O.C	90	1
Epoxy, N.O.C.	5	0
Fibrous Glass	5	0
Glass	3	0
Iron	20	4
Oil Mist	23	3
Silica	42	4
Wood Dust, N.O.C.	3	1
Zinc Stearate	2	0
Total	485	36

AIR SAMPLES COLLECTED

2. CHEMICALS

Substance	Number	Number In Harmful Range
Acetone	39	1
Acrylonitrile	3	0
Amyl Acetate	3	0
Benzene	14	0
Beryllium	7	0
Butyl Acetate	10	0
Butyl Cellosolve	5	0
Cadmium	10	0
Cellosolve	4	1
Cellosolve Acetate	12	0
Chromium	13	0
Chromic Acid	1	0
Cobalt	10	0
Copper	21	6
Epichlorohydrin	6	0
Ethyl Acetate	10	0
Ethyl Benzene	2	0
Ethyl Alcohol	17	0
Ethyl Ether	12	0
Ethylene Glycol	5	0

Substance	Number	Number In Harmful Range
Fluoride	4	0
Formaldehyde	32	1
Freon, N.O.C.	10	0
Gasoline	2	0
Halothane	9	0
Heptane	3	0
Hexane	9	0
Hydrogen Chloride	5	0
Isocyanates, Aliphatic	5	0
Isophorone	6	0
Isopropyl Alcohol	24	5
Lead	282	78
Methane	4	0
Methanol	19	0
Methyl Butyl Ketone	3	0
Methyl Cellosolve	5	0
Methyl Chloride	3	0
Methylene Chloride	24	2
Methyl Chloroform	4	0
Methyl Ethyl Ketone	34	0
Methyl Isobutyl Ketone	29	0
Mineral Spirits	9	0

Substance	Number	Number In Harmful Range
Naphtha	9	0
Nickel	8	1
Nitrogen Dioxide	2	0
N. Propanol	5	5
Organic Vapors, N.O.C.	2	0
Ozone	8	0
Perchloroethylene	11	4
Petroleum Distillate	1	0
Phosphoric Acid	2	2
Propyl Acetate	10	3
Silver	8	0
Solvents, N.O.C.	9	0
Styrene	34	0
Sulfur	6	0
Sulfuric Acid	2	2
Thanol	10	3
Thorium	5	2
Tin	17	0
Titanium Dioxide	1	0
Toluene	71	3
Toluene Diisocyanate	15	2
Trichloroethylene	30	5

Substance	Number	Number In Harmful Range
Trichlorotrifluoroethane	5	0
Trimellitic Anhydride	6	0
Turpentine	3	0
Vinyl Chloride	19	14
Xylene	60	2
Zinc	43	2
Total	1130	144

LABORATORY WORK

AIR SAMPLES		2067
Chemical	1581	
Particulates	485	
Material Samples		447
Chemical	26	
MIcroscopic	421	
Smear Samples		15
Chemical	5	
Particulates	10	
Urine Samples		1262
Hippuric Acid	98	
Lead	91	
Mercury	1037	
Trichloroacetic Acid	36	
Blood Tests		4111
Lead	2273	
Zinc Protoporphryn	1838	
Breath Tests		20
Carbon Monoxide	20	
Proficiency Analytical Testing Program		
Asbestos	28	
Cadmium	28	
Lead	28	
Solvents	8	
Zinc	8	
West Allis Memorial Hospital Blood Testing Program		
Lead	12	12

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2. Recommended Safe Practices for Open Tanks; Ventilation Data Sheet No. 5, Bulletin No. 1259, July 1979.
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4. Recommended Safe Practices for Chlorine; Chemical Data Sheet No. 36, Bulletin No. 1261, October 1979.
5. Recommended Safe Practices for Styrene; Chemical Data Sheet No. 37, Bulletin No. 1262, October 1979.
6. Recommended Safe Practices for Aniline; Chemical Data Sheet No. 38, Bulletin No. 1263, September 1979.
7. Recommended Safe Practices for Krypton^{85}; Physical Data Sheet No.15, Bulletin No. 1264, October 1979.
8. Recommended Safe Practices for Asbestos; Mineral Data Sheet No. 2, Bulletin No. 1265, October 1979.
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13. The Occupational Health Unit. Bulletin No. 1271, November 1979.
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25. Recommended Safe Practices for Fibrous Glass; Mineral Data Sheet No. 9, Bulletin No. 1286, March 1980.

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27. Recommended Safe Practices for Tritium; Physical Data Sheet No. 14, Bulletin No. 1288, March 1980.

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31. Recommended Safe Practices for Petroleum Naphtha; Chemical Data Sheet No. 21, Bulletin No. 1292, March 1980.

32. Recommended Safe Practices for Emergency Medical Transportation; Nursing Data Sheet No. 5, Bulletin No. 1293, March 1980.

33. Recommended Safe Practices for Ultraviolet Radiation; Physical Data Sheet No. 3, Bulletin No. 1294, April 1980.

34. Asbestos in Boiler Rooms and Pipe Covering; Bulletin No. 1295, April 1980.

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THE COMMONWEALTH OF MASSACHUSETTS

EDWARD J. KING, *Governor*

EXECUTIVE OFFICE OF ECONOMIC AFFAIRS
George S. Kariotis, Secretary

DEPARTMENT OF LABOR AND INDUSTRIES
William M. [illegible], Commissioner

DIVISION OF OCCUPATIONAL HYGIENE
Leonard D. Pagnotto, C.I.H., *Director*

PREVENTION

DETECTION EVALUATION

CONTROL

GOVERNMENT DOCUMENTS
COLLECTION
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1982

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1982 ANNUAL REPORT OF THE DIVISION OF OCCUPATIONAL HYGIENE

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ANNUAL REPORT OF THE DIVISION OF OCCUPATIONAL HYGIENE

FISCAL YEAR 1982

This Annual Report records the program and activities of the Division of Occupational Hygiene, of the Department of Labor and Industries for the fiscal year beginning July 1, 1981.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES".

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Harold Bavley, P.E., C.I.H., Director
Leonard D. Pagnotto, M.S., C.I.H., Assistant Director
Edward L. Baker, M.D., Occupational Hygiene Physician
Richard Levine, B.S., Chief of Laboratory
Rexford G. Alexander, M.S., C.I.H., Chief of Engineering Services
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Patricia M. Circone, B.S., Senior Chemist
Linda E. Tremblay, B. S., Senior Chemist
Virginia M. Summers, R.N., M.S., Supervising Occupational Hygiene Nurse
Erwin Allen, B.S. (CH Eng) Senior Chemist
Karen F. Irving, M.S., Senior Chemist
Ellen J. Newlands, B.S., Senior Chemist
Joel P. Weddig, B. S., Assistant Industrial Hygiene Engineer
Frank M. Kramarz, B. S., Assistant Industrial Hygiene Engineer
Charleen B. Sotolongo, M.S., Assistant Chemist
Richard V. Grillo, M.S., Assistant Chemist
Bernice Linde, B.S., Administrative Assistant
Mary S. Lim, Senior Library Assistant
A. Rae Yudis, Senior Clerk-Stenographer
Marilyn A. Stacey, Senior Clerk-Typist

The following personnel changes occurred during Fiscal 1982:

Harold Bavley retired on March 31, 1982 and Leonard D. Pagnotto was appointed to the position of Director on May 30, 1982.

On December 27, 1981 Rose H. Goldman, M.D., replaced Edward L. Baker, M.D., who resigned from the position of Occupational Health Physician on September 8, 1981.

Richard Levine was promoted from the position of Chief of Laboratory to the position of Assistant Director on June 20, 1982.

Karen Irving, Senior Chemist, resigned on November 20, 1981, and was replaced by Richard V. Grillo from the Asbestos Commission Program on April 12, 1982.

Ellen Newlands, Senior Chemist, resigned on December 11, 1981.

Charleen Sotolongo, Assistant Chemist on the Asbestos Commission Program, resigned on September 4, 1981, and was replaced by Janice LaMalva on September 10, 1981.

Marilyn Stacey, Senior Clerk-Typist, was replaced by Eleanor Sullivan on September 18, 1981.

A. Rae Yudis, Senior Clerk-Stenographer, retired on December 31, 1981.

Claudia Kelly joined the Division as a Library Reference Assistant on March 8, 1982.

The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by the legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of industrial health problems.

The Division is divided administratively into an Engineering Section, a Chemical Section including a laboratory, a Medical and Nursing Section, and an Information Section.

GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston. The Division occupies approximately 6,150 square feet at this location. Employment of a full staff would result in overcrowding with a need for at least 2,000 square feet of additional office space.

A total of 1,568 services were undertaken, including 525 requests for information on matters pertaining to occupational health. These services required a total of 1,302 plant visits, 152 visits to other agencies, and

14 talks and lectures by the Division staff. This is an increase over 1981 of approximately 2% for plant visits even though there were position vacancies.

Field studies involved 6,893 measurements of environmental conditions and the collection and analysis of 386 chemical, 169 dust air samples, and 101 gas samples in places of employment. In addition, the laboratory evaluations included the analysis of 829 air samples, 897 urine samples, 333 material samples, 4,994 blood samples, and 17 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U. S. Department of Health and Human Services, and analyzed 88 simulated air samples for asbestos, lead, cadmium, zinc and solvents with West Allis Memorial Hospital for 9 blood samples and with the Center for Disease Control for 12 blood samples.

The plant studies and visits resulted in more than 2,295 recommendations potentially affecting 62,621 workers.

7(c)(1) ON-SITE CONSULTATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7(c)(1) On-Site Consultation Program sponsored by the U. S. Department of Labor, Occupational Safety and Health Administration (OSHA), which provides on-site consultation and in health and safety matters at the employers' requests.

The Division of Occupational Hygiene provides Health Consultants for the solution of industrial hygiene problems in the private sector by the detection, evaluation and control of existing and potential health hazards resulting from occupational exposures.

During Fiscal 1982, 259 requests were received from employers for this free consultation service. Our staff of health consultants completed a total of 248 surveys which included complete and special hazard inspections and evaluations.

The entire health consulting staff completed the OSHA Consultation Course given at the University of Alabama. The course covers the fundamentals of the On-Site Consultation Program and the development of communicative skills of the consultants.

The program has a large backlog of requests from all types of industries in Massachusetts.

We have received several letters from employers complimenting this voluntary consultative service.

The 7(c)(1) On-Site Consultation Program continues as a desirable program for this Division and for the employers in this Commonwealth. A total of 2,192 environmental analyses and 214 ventilation studies were performed. A total of 330 air samples were collected.

THE ASBESTOS PROGRAM

Introduction:

"Asbestos" is the generic name used to describe a family of minerals which occur naturally as masses of fibers. Asbestos in all its forms is carcinogenic and a respiratory hazard.

The fact that asbestos is a dangerous material, capable of causing serious health problems, has been systematically documented since the early 1900's. Asbestosis, a chronic lung ailment characterized by shortness of breath and extensive lung fibrosis resulting from prolonged exposure to high fiber levels, was the first disease associated with asbestos dust.

In the late 1940's, asbestos was found to be a potent cancer-producing agent in addition to causing asbestosis. It was established that, among asbestos workers, there was a greatly increased risk of death from lung cancer, and from pleural and peritoneal mesothelioma (a rare cancer associated with asbestos exposure). Also, evidence suggested a connection between asbestos exposure and gastro-intestinal, oropharyngeal and laryngeal cancer.

Recently, it has been established that the potential for developing cancer from asbestos exposure is not limited to people who work with asbestos. For example, it is believed that some family members of asbestos workers have developed mesothelioma due to asbestos contamination of the home, from soiled workclothes. Also, it has been shown that friable asbestos products used in buildings for decoration, fireproofing, noise abatement, condensation control, and insulation can be potentially hazardous to building occupants. Frequently, these surfaces are exposed and accessible. They can include open and visible sprayed ceilings, walls, structural members or steam pipes, or surfaces hidden by suspended ceilings accessible to custodial staff.

When these friable materials are disturbed, exposure to asbestos fibers released from the material can reach levels considered potentially hazardous. Since no safe level of exposure has been established, it is currently assumed that any exposure to asbestos should be avoided. In addition, the long latency period for mesothelioma development would indicate that young people exposed to asbestos now could develop mesothelioma in their thirties and forties.

Because of the health hazards associated with sprayed-on asbestos materials, the Environmental Protection Agency banned spray application of insulating or fireproofing material containing more than one percent asbestos by weight in 1973. Spraying asbestos for any purpose was restricted by the EPA in 1978.

The Asbestos Program originated in 1975 because medical evidence suggests that individuals exposed to asbestos fibers are vulnerable to environmentally induced cancers. Since the Program's beginning public concern has arisen that asbestos in schools could pose a health hazard to the occupants, particularly for school children. Although most of the Program's concern is directed toward the 2,400 public schools, it also has the responsibility of assessing approximately 10,000 public buildings.

The Asbestos Program within the Division of Occupational Hygiene offers a comprehensive assessment program. This program includes inspection and identification of friable material, bulk and air sampling, exposure assessment and current methods of corrective action.

The following tables summarize the work that has been completed.

	Surveyed	Not Surveyed	Number of Schools with Asbestos Spray-on Material	Number of Schools with Asbestos Pipe Insulation (approx.
Phase I Schools	1,432	0	178	1,400
Phase II Schools	18	713	0	17

Phase I schools were built or renovated between 1946 and 1972. During this period, spray-on asbestos material was used extensively.

Municipal Building Surveys

Total Number of Buildings	Number of Buildings Surveyed	Number of Buildings Containing Spray-on Material	Number of Buildings with Asbestos Pipe Lagging
4,709 (estimated)	775	102	550

State and County Prison Surveys

Total Number of Institutions	Number of Institutions Surveyed	Number of Buildings Surveyed	Number of Buildings Containing Spray-On Material	Number of Buildings with Asbestos Pipe Lagging
11	4	36	0	25

Department of Public Works Surveys

Division	Total Number of Buildings	Number of Buildings Surveyed	Number of Buildings Containing Spray-On Material	Number of Buildings with Asbestos Pipe Lagging
Highways	373	1	0	0
Waterways	11	0	0	0
Total	384	1	0	0

Metropolitan District Commission Surveys

Division	Total Number of Buildings	Number of Buildings Surveyed	Number of Buildings Containing Spray-On Material	Number of Buildings wit Asbestos Pipe Lagging
Water	195	1	0	0
Sewerages	51	0	0	0
Parks and Recreation	307	0	0	0
Total	553	1	0	0

SCHOOL ANALYSIS BY CATEGORY

Department of Public Safety Surveys

Total Number of Buildings	Number of Buildings Surveyed	Number of Buildings Containing Spray-On Material	Number of Buildings wi Asbestos Pipe Lagging
Total 43	1	0	0

Public Higher Educational Institutional Surveys

Educational Institutions	Number of Institutions	Total Number of Buildings	Number of Buildings Containing a Spray-On Coating	Spray-On Containing Asbestos	Number of Buildings with Asbes Pipe Lagging
University	3	129	18	12	96
State Colleges	9	103	24	6	61
Community Colleges	15	106	25	8	44
Mass. College of Art	2	12	0	0	5
Total	29	350	67	26	206

Schools Reviewed Yearly

Number of Schools in Review Category 6	Schools Surveyed	Number of Schools with Ferris Index Over 21
45	45	5

Schools Reviewed After Three Years

Number of Schools in Review Category 5	Number of Schools Surveyed	Number of Schools with Ferris Index 10-20	Number of Schools with Ferris Index Over 21
72	72	7	1

School Analysis by Category

	No-Spray-On	Spray On No Asbestos	No Significant Asbestos Exposure	Review in Three Years	Review In One Year	Action School	Total
Phase I	1,165	89	8	67	45	58	1,432
Phase II	18	0	0	0	0	0	18

On May 27, 1982, the Environmental Protection Agency published a rule requiring all public and private elementary and secondary schools to identify friable asbestos materials. These schools must also maintain records and notify employees and parent-teacher associations of the location of this material.

The schools must then provide the employees with instructions on reducing exposure to asbestos.

The Division of Occupational Hygiene will assist the schools in meeting these EPA requirements. This will be accomplished by providing training sessions on how to inspect, detect, and collect friable asbestos material.

Once bulk samples are collected, the Division of Occupational Hygiene will analyze these samples for asbestos content. The Asbestos Program staff will continue to provide consultation on exposure assessment and methods of corrective action.

CHAPTER 651

Recently, through Chapter 651 of the Acts of 1982, the legislature unfroze 1.38 million dollars in previously appropriated funds for removal or encapsulation of asbestos in public schools, with first priority going to those projects determined by the Division of Occupational Hygiene to be most hazardous.

Chapter 2 of the Sanitary Code: Minimum Standard of Fitness for Human Habitation

The Asbestos Program is presently working with the Department of Public Health, the Environmental Protection Agency and the Massachusetts

Consumers Council in developing an amendment to the State Sanitary Code. The purpose of this proposed amendment is to minimize exposure to asbestos dust in dwellings. The amendment deals with one common and easily identified source of such dust: Asbestos-containing insulation in pipes, boilers, and furnaces.

Asbestos Disposal

Asbestos disposal is regulated by the Federal Environmental Protection Agency, the Massachusetts Department of Environmental Quality Engineering, and local boards of health. The Asbestos Program staff has included a provision for safe asbestos disposal at an approved landfill site in its suggested safe practice bulletin dealing with asbestos removal contracts. However, the great amounts of publicity about the dangers of asbestos have made towns reluctant to accept asbestos even at E.P.A. and D.E.Q.E. approved sites. This has made legal disposal the most difficult part of asbestos abatement.

The issue of asbestos in schools and public buildings is and will continue to be a concern especially to parents.

Public awareness and the E.P.A. ruling greatly increased the request for additional asbestos surveys.

If the Division of Occupational Hygiene is going to continue offering its consultative and analytical services, the present staff of three should be increased to meet the already existing demand.

COMMITTEE ON NON-IONIZING RADIATION

The Director of the Division of Occupational Hygiene, as a member of the Ad Hoc Committee on non-ionizing radiation, attended the monthly meeting of this Committee wherein it was decided to recommend to the State Department of Public Health that a standard be promulgated on non-ionizing radiation in the frequency range of .1 megahertz to 3 gigahertz. Other frequency ranges will be studied for future standard development.

STRUCTURAL PAINTING BULLETIN REVISED

The Assistant Director was assigned by the Commissioner to a task force to revise Bulletin No. 13 which contains rules and regulations for structural painting. The task force consisted of union, management and governmental representatives. The Division's contribution to this assignment was to completely revise and expand the section on occupational health matters. The work on the bulletin was completed and a public hearing was held in July, 1981. Final revisions are being made prior to promulgation of the rules and regulations.

ABRASIVE BLASTING INSIDE OFFICE BUILDING

Office workers on an occupied floor above a floor where interior abrasive blasting was being done complained of visible dust emissions within their office spaces. Before blasting started, workers reportedly had taped and plastic-sheeted stairways and elevator openings and sealed visible pipe and other openings between floors. According to the foreman of the blasting crew, someone had opened the elevator shaft door and the stairway door while blasting was being done, and natural drafts pulled blasting dust upwards to other floors. Visible dust evidence on carpeting on the floor immediately above indicated that some blasting dust had leaked through the crack between the upper floor and the wall.

Further investigation discovered that the blasting abrasive being used was a silica sand not approved for use in Boston. It was also discovered that the out-of-town company did not have an abrasive blasting permit from the Boston Pollution Control Commission. The company was told of the need to have such a permit and the Commission was informed. The blasting company obtained a permit after securing a supply of non-silica abrasive grit.

To better control dust emissions to adjacent areas, it was recommended that the abrasive blasting workers monitor adjacent occupied floors or offices during blasting. Where leaks became evident, the cracks or gaps in these areas could be sealed from the outside if possible. Another alternative would be to do the abrasive blasting at times when adjacent office areas are not occupied.

Additional monitoring of the abrasive blasting project will be performed to assure the safety and health of the abrasive blasting workers as well as employees in offices adjacent to the blasting.

RECOMBINANT DNA CONFERENCE

Two members of the chemical staff and the Director of the Division attended a three day conference on genetic technology at Tufts University, Medford Campus. The conference focused on the science of recombinant DNA technology through which the genes of one organism can be transferred to another and completely alter its characteristics.

The first discussion was on the basic recombinant DNA process. It was explained that this process selectively fragments DNA molecules using specific enzymes and attaches the fragment to another DNA molecule. The recombined DNA molecule is then introduced into a host organism that performs functions dictated by the new message center.

The commercial potential for recombinant DNA science was reported to be enormous. Significant progress has been made in programming bacterial production of insulin and the antiviral agent interferon. Insulin is currently produced in small quantities from animal tissue. Interferon is derived from human blood cells, but the process is very time-consuming and the yield is extremely small.

As firms began to locate in communities, residents have expressed concern about the potential adverse effects on health or the environment of gene splicing technology. Consequently, a number of cities have passed legislation to control the recombinant DNA industry based on guidelines published by the National Institute of Health. The local regulations and the NIH guidelines were discussed in detail.

GENETIC ENGINEERING

Four members of the staff attended the Massachusetts Public Health Association's one day working conference on genetic engineering and public health. The purpose of the conference was to develop a model ordinance that could be adopted by local cities and towns who face the possibility of biotechnology firms in their jurisdiction. Topics of discussion included a technical review, potential health and environmental hazards, regulatory issues, including a review of the former and present NIH Guidelines, and the presentation of the MPHA's model ordinance.

Members of the communities, industry, academia, and the government participated in the discussions. It was the general opinion of most of the participants that some form of legislation is necessary. The express wish of industry was that state legislation is preferable to numerous local statutes. Specific discussions from community concerns included the problems of citing such facilities, and the amount of flexibility that should be incorporated into legislation. Academic researchers questioned the effectiveness of employee medical monitoring and the prudence of limiting access into DNA laboratories during experiments.

The safeguarding of the public and the environment from the potential hazards of recombinant DNA is still very much the concern of the public health and scientific communities.

ASBESTOS REMOVAL REQUIRES SPECIAL CONTROL

A member of the Asbestos Program Staff was called in to observe the removal of asbestos pipe lagging from the Veterans' Housing Project in Brookline, Mass. A new heating system was being installed in the complex, necessitating the removal of both the pipes and the asbestos insulation which covers them. This job posed a unique problem, since it had to be performed while the apartments were occupied.

A test apartment was chosen and air monitors were set up to assess the amount of airborne fibers generated during the removal. The method chosen was to carefully split the lagging along the length of the pipe and, while spraying the pipe with water pull it off in as few pieces as possible. The lagging was immediately placed in the disposal bag, which was also sprayed with water. The results of the air testing showed airborne fiber levels which were over twice the non-occupational exposure level.

For this reason a second visit was made to attempt to develop a new removal method. It was decided to cut the whole pipe lagging at ceiling level and below the lagging at floor level. The ends of the pipe were then sealed with tape, and the pipe was removed with the lagging intact. Air monitoring results showed the room air count to be at the non-occupational exposure limit. This removal method was, therefore, the one of choice for this particular removal job. It should be noted, however, that ideally, the apartments should have been vacated during the removal process in order that the work areas be effectively isolated with polyethylene sheeting.

IS THERE A NEED FOR A N.E. OCCUPATIONAL HEALTH FORUM?

The Boston Regional Office of the National Institute for Occupational Safety and Health (NIOSH) convened a special meeting to discuss establishing a "New England Occupational Health Forum". The Regional Consultants of the Boston and New York Offices, the Director of the Division of Occupational Hygiene and representatives of industry, research establishments, and academia were present to determine whether an effort in this area should be undertaken; whether there was a need for such a forum; a review of similar meetings that may have been established or conducted in the past; problems that may be encountered in establishing such a forum; and a discussion of participants' comments.

It was decided that there was a need for a forum on special pertinent problems in occupational health and that the Boston regional consultant would request support from several professional societies.

A SEMINAR FOR MASSACHUSETTS EMPLOYERS

The Director and key personnel of the Massachusetts Department of Labor and Industries gave a repeat performance in their presentation of the seminar "Massachusetts Labor Laws and Their Impact on Your Employer - Employee Relations" to the Central Massachusetts Employers Association.

Each speaker presented a history of his agency and described its organization and functions and what special services it provides.

The seminar was received well by this employers' association.

CANCER SYMPOSIUM AT MASSACHUSETTS GENERAL HOSPITAL

The Assistant Director attended a three-day symposium at the Massachusetts General Hospital on handling highly toxic and carcinogenic chemicals. The program was sponsored by the National Institutes of Health and covered:

a) Cancer statistics on laboratory workers

b) Medical surveillance procedures

c) Environmental testing methods

d) Engineering controls

The symposium was attended by about 100 health and safety personnel in the Boston and New England area.

ODOR HAZARD REQUIRES SPECIAL INVESTIGATION

The Milford Health Department called our Division for assistance in locating the source of a chemical odor in the basements of several stores in a downtown city block. The odor was identified as a paint solvent. No apparent source was located in the basement areas of the stores. An investigation was then directed to the upper stories of the building. It was found that renovations were being made in a health spa and that the work had been in progress for several months. About a month ago, the floors on the basement level of the health spa were sealed with a resinous material. It was at this time that the solvent odor problem was first noticed. It was determined that the solvent fumes penetrated the floor area and spread to the other basements on the block. The work was completed the following day. No further complaints were reported.

DOH MEMBER OF PUBLIC HEALTH'S ASBESTOS COMMITTEE

The Division of Occupational Hygiene's Asbestos Program Staff participated in a committee sponsored by the Massachusetts Department of Public Health. The committee's objective was to investigate the potential health hazards associated with airborne asbestos fibers in dwellings and possible regulation in the Sanitary Code.

Much of the discussion centered around home improvement projects that involve asbestos boiler covering and pipe insulation. Other specific sources of asbestos found in residential dwellings were floor tile, asbestos board and ceiling coatings.

The consensus of the committee was that there is a need for asbestos regulation in the Sanitary Code and further meetings would be needed to determine the best way to implement them.

UNCONTROLLED PROCESS CAUSES AEROSOL PLANT EXPLOSION

The Division investigated an explosion in a plant engaged in packaging household products in pressurized cans. The gas propellant employed was isobutane, a highly flammable hydrocarbon which currently is widely used in the industry since Freons were largely banned for this purpose because of environmental factors.

The accident occurred in the gassing room during a change-over in process. Through a malfunction of equipment, isobutane gas was drawn into the evacuation system and dispersed into the production area through an exhaust pipe. The gas was detonated by static or by a spark causing 24 workers to be hospitalized for severe burns. Two of the workers have died from burns. The prognosis for the others is not known with certainty. The accident is still under investigation by the Department of Labor and Industries.

U. S. GOVERNMENT ACCOUNTING OFFICE INTERVIEW

A member of the Division's Asbestos Program was interviewed by a representative of the Government Accounting Office. The discussion highlighted the history and current progress of the Division's Asbestos Program. Topics such as methods of asbestos detection, asbestos control measures and cost factors were also included. Of particular interest was the progress made with the schools and other public buildings in Massachusetts.

SPECIAL SURVEY OF AEROSOL PACKAGING PLANTS IN MASSACHUSETTS

As a result of a devastating explosion at an aerosol packaging plant in eastern Massachusetts, our Division initiated a health and safety survey of the aerosol packaging industry in this state. It was learned that there are approximately 8 plants in Massachusetts that package products in pressurized cans. To date, four of these plants have been visited to determine their methods of operation and safeguards used to prevent a fire or explosion.

None of these plants performs the evacuation - pressurizing steps utilized by the plant that suffered the fire and explosion. All four of the plants carried out the gas filling step in a concrete structure completely separated from the main building. Each gassing room, furthermore, was equipped with flammable sensing devices, emergency equipment, and warning devices, emergency equipment, and warning systems. It was apparent that the pressurized can industry has thoroughly studied its problems and has for the most part done something about them. A final report on these plants will be prepared at the conclusion of this survey.

WORKERS AFFECTED BY MYSTERIOUS CHEMICAL

The International Ladies Garment Workers Union (New England Region) submitted to the Division for analysis ten samples of fabric which they believed could be causing rashes and respiratory irritations. The Division completed the analysis and found significant levels of formaldehyde which is a known irritant and could easily be responsible for the problems.

PROTECTION OF THE SENSITIVE WORKER

The Division's Director attended an outstanding topical symposium, "Protection of the Sensitive Individual" sponsored by the American Conference of Governmental Industrial Hygienists and the Arizona Center for Occupational Safety and Health at Tucson, Arizona. Outstanding speakers representing academia, industry, government and law firms discussed the definition of the sensitive worker, epidemiological approaches to defining sensitive workers, and the immunological, biochemical and genetic approaches to this problem. Dr. Stuart M. Brooks, University of Cincinnati School of Medicine, provided an assessment of clinical changes in respiratory, cardiovascular and other systems. Dr. Vilma Hunt, College of Human Development, Penn State University spoke on the reproductive system sensitivity through the life cycle. One session was devoted to occupational exposure limits and the relationship to the sensitive worker. Employer/employee relations and responsibilities were discussed by union and industry representatives. The final session was devoted to legal and ethical issues by a panel made up of private and government attorneys.

Approximately 125 industrial hygienists and related personnel attended this excellent seminar.

CHANGES IN OSHA NOISE STANDARD

Some of the amendments of the OSHA Noise Standard have been promulgated and are now in force. These amendments have to do with defining a hearing conservation program and what exposure level shall initiate the need for a hearing conservation program.

As a result of the new amendments, there has been an increase in the number of requests for noise surveys from industry. The proper equipment for the measurements for the new standards is not on hand, but the OSHA consultants have been interpreting measurements from the old equipment. Perhaps the new equipment will be available through the On-Site Consultation Program funds.

Bulletin No. 1351 has been published by the Division abstracting the requirements of the new amendments.

NEW ENGLAND SECTION, AIHA ANNUAL MEETING

The New England Section of the American Industrial Hygiene Association held its annual all day technical meeting at the Lynnfield Hilton in Wakefield. Most of the Division's technical staff attended.

The theme of the technical sessions was "Genetics and Bioengineering". Talks on this subject were presented by experts in this rapidly expanding science. The speakers focused on the hazards, control and medical surveillance of biological hazards associated with genetic engineering. The industry is in its infancy and there are many unanswered questions about the potential health problems that may exist. Some of these were dealt with at the meeting.

INCREASE IN NOISE SURVEYS

The recent additions to the OSHA standards on noise exposure in industry have resulted in a substantial increase in requests from Massachusetts manufacturers for noise surveys. The amendments require noise surveys by February, 1982, for the determination of employees who should have annual hearing audiograms and subject to medical surveillance.

Presently, about 50% of the consultation visits are devoted to noise measurements. Of these visits, about one third have noise exposures in excess of the OSHA regulations, requiring some action by the employers. Equipment limitations have slowed our response to the employer consultation requests.

FUME EXPOSURE AT MEDICAL SCHOOL

The Division investigated complaints of ill health by workers reportedly exposed to fumes from laboratory hoods on a construction site at the Harvard Medical School complex. The construction involved adding two new floors to one of the existing research buildings.

To permit research activities to continue on the lower floors during the construction period, temporary flexible exhaust ducts were installed on the fume hood in the laboratory to ventilate them to the outside. According to the workers, this exhaust system would sometimes fail and fumes from the laboratory hoods on the floors below would permeate the construction areas.

The workers were concerned that some of the chemicals used in the laboratories were reported to be carcinogenic. A review of the chemical inventory, however, failed to reveal the presence of any known human carcinogen.

At the time of our visit, the flexible ducts were no longer in use. Permanent duct work had been installed and was functioning quite satisfactorily. Air tests taken in the construction area on charcoal and analyzed by the D.O.H.'s gas chromatography did not reveal the presence of any chemical air contaminants. The workers who still complain about ill health will be examined by a physician from the Harvard School of Public Health.

OVEREXPOSURE OF STATE POLICEMAN TO CARBON MONOXIDE

In January the Massachusetts State Police requested that the Division of Occupational Hygiene perform carbon monoxide tests at some of their police vehicles. This request was prompted by an accident which occurred when one of the troopers became unconscious while at the wheel. A blood test taken one week after the accident showed the trooper's blood carboxyhemoglobin level to be 10.3%, indicating a possible carbon monoxide exposure from his car.

A total of 15 state police vehicles were tested. With the exception of the car that was involved in the accident, Car No. 217, all cars showed low levels of carbon monoxide in their interiors during normal operating procedures. High levels of carbon monoxide could be obtained in Car No. 217 when the car was stationary and idling.

In view of these results, it was recommended that the exhaust system and floorboards of Car No. 217 be rechecked by a mechanic for possible exhaust leaks. Also, troopers who have to spend more than 10 minutes in their cars at a stop, with the engines running, should have both side windows partially open to allow adequate ventilation of the car's interior.

CARBON MONOXIDE EXPOSURE FROM A METAL TREATING PROCESS

Six workers in a factory where metals are processed complained of headache, nausea and flu-like symptoms. Carboxyhemoglobin levels were markedly elevated (25-37%). The Division of Occupational Hygiene was called to investigate the source of the carbon monoxide leakage.

To provide an oxygen-free atmosphere in the furnaces, carbon monoxide is generated by the incomplete combustion of natural gas in the annealing department. Hoods are used to exhaust the carbon monoxide which escapes at the furnace exits.

Carbon monoxide levels were measured throughout the factory. High readings (130-250 ppm) were traced to several of the carbon monoxide using furnaces, the annealing department. Immediate measures were recommended, such as use of overhead exhaust and lowering the concentration of the carbon monoxide used in the gas mixture. These measures succeeded in temporarily lowering the carbon monoxide levels. Recommendations were given for some long term engineering changes in the ventilation system and for the installation of an alarm system.

FORMALDEHYDE EXPOSURE IN A VETERINARIAN SCHOOL ANATOMY LABORATORY

The Division was requested to investigate complaints by students o headaches, drowsiness and eye irritation during their veterinarian gross anatomy laboratory session. At the request of their industrial hygienist, air samples were collected during a two-hour laboratory session. The animals involved were horses, cows, goats, sheep and dogs embalmed with a phenol formaldehyde solution. During the laboratory session the students each examine four of the prepared animals. Although formaldehyde and phenol values were below occupational hygiene standards, the concentrations of formaldehyde were high enough to cause the symptoms noted. Recommendations to control formaldehyde concentrations were made.

GAS LEAK SENDS 15 WORKERS TO HOSPITAL

The Division investigated a chemical odor problem in an assembly department of an electronics firm and which caused 15 workers to be hospitalized.

The chemical had a characteristic mercaptan odor and was traced to a basement room of the plant. The odor entered the assembly department on the first floor through an elevator shaft. Further testing revealed that the chemical was coming in through cracks in the outside wall of one basement room. It was later determined that there was a break in the natural gas pipe buried in the street near the basement room. The gas company was notified, and their tests on the street confirmed the gas leak.

Tests for mercaptan were performed in the basement room and in the assembly department. The concentrations found were extremely low. Mercaptans which are used as odorants in natural gas are detectable in trace quantities. The odor even at these levels is objectionable and may cause some individuals to react quite adversely to it. This appears to be what happened at this plant.

The gas company repaired the gas leak, and the odor problem has disappeared.

CHROMIUM EXPOSURE STUDY AT BLACKSTONE SEWAGE TREATMENT PLANT

The Division is cooperating with the Massachusetts Department of Public Health and the Massachusetts Division of Environmental Quality Engineering to study exposure of sewage treatment workers to chromium. Chromium exists in several valence forms. Some chromium compounds with a valence of six have been found to be carcinogenic. The purpose of the study is to determine the health risk of the average worker employed at the Blackstone site. Air sampling and sewage residue analysis will be performed on a periodic basis to establish a base line exposure pattern. The study is expected to take several months to complete.

BAD AIR COMPLAINTS AT A PUBLIC HIGH SCHOOL

The Division was requested to investigate complaints of ill health by students and staff members of a high school. The symptoms included headaches, throat dryness, and respiratory distress and related problems. Tests were made on the ventilation system and it was found that not enough air was being supplied. Recommendations were made to increase the air supply and balance the ventilation system.

PCB LEAK AT LOGAN AIRPORT

The Division was requested to investigate a (P.C.B.) polychlorinated biphenyl leak in a transformer in one of the utility rooms at the Logan Airport. Tests were made for PCB exposure, but no environmental contamination was found. The PCB on one floor was cleaned up by a professional decontamination squad and was properly disposed of. No further problems were experienced.

INVESTIGATION OF RESPIRATORY PROBLEMS AT A MUNICIPAL BUILDING

The Division was initially requested to evaluate potential lead contamination from a police firing range located in the basement of a municipal building. It was later learned that one basic problem was that many of the occupants of the building were complaining of respiratory problems, eye irritation and general fatigue.

Testing in one firing range and in selected areas of one building indicated that lead contamination was in fact confined to one firing range. As an extra measure of precaution blood lead analyses were performed on fifty-two municipal employees randomly selected. All blood lead levels were well within the normal range.

Tests were than performed for several other environmental contaminants, and no excessive chemical exposures were found. A certain staleness in the air, however, was noted in some of the offices in the building. Ventilation measurements revealed that most offices of the building had no more than three air changes per hour which is considered inadequate. Furthermore the total amount of air being supplied to these rooms was below that recommended by ASHRAE for comfort. It was concluded that the respiratory problems experienced by the municipal employees were due to an inadequate air supply. Recommendations were made to correct this situation.

SEMINAR ON BULLETIN #13 ON STRUCTURAL PAINTING

Bulletin #13 on Structural Painting was completely revised and approved for distribution. The health requirement section was most affected. Since most of this section was completely new, Commissioner Shipps recommended that the material be presented to painting Union Business Agents. A two day seminar therefore was held in a conference room on the 11th floor at 100 Cambridge Street. The symposium included a detailed review of the medical, respiratory, and ventilation requirements of the revised bulletin. Members of this Division's medical, chemical and engineering sections participated in the presentations. All the proceedings were videotaped for future showing to the Department's Industrial Inspectors who will administer the requirements of Bulletin #13.

CANCER SCARE AT PUBLIC LIBRARY

Five library employees were reported to have developed cancer over a period of seven years. The high cancer incidence caused library officials to call for an investigation of the air quality of the building. The Division performed air tests and ran infrared scans in various locations of the library. The scans and air tests did not reveal any significant findings. Ventilation measurements, however, showed that very little fresh air was supplied to the library. It was also noted that the fresh air intake was located at ground level adjacent to a busy street, thus allowing at times significant amounts of automotive exhaust to be drawn into the library environment.

No causal relationship between the cancers and the library environment was determined. Corrective action, however, concerning the ventilation system was made.

FIREMEN FELLED BY MYSTERIOUS VAPORS

Firemen responded to a fire alarm alert from a toy-manufacturing plant. Upon arrival the firemen did not find any smoke or fire, but the sensors nevertheless tripped the Halon fire extinguishing system, causing this fire retardant to escape into the room. Halon is a gaseous compound consisting of bromofluoromethane. This material is an irritant at fairly high concentrations. Four firemen who were in the plant suffered significant exposures of Halon and were sent to the hospital for treatment. The cause of the fire alarm alert was not determined. It was suspected that it was due to a fault in the alarm system. No further episodes were reported.

METHYLENE EXPOSURE CAUSED PLANT SHUTDOWN

Over 60 electronic industry employees were hospitalized when their work area became contaminated with some unknown chemical contaminant. The chemical, it was learned, was methylene chloride that leaked into the production line from a chemical storage area. Once the source of the contamination was located and removed, the exposure problem was resolved. One interesting feature of this problem was that all of the workers seen at the hospital had elevated carbon monoxide blood levels. This was explained by the fact that methylene chloride is metabolized to some extent by the body, and one of its metabolic products in carbon monoxide.

NURSING ACTIVITIES

Nursing activities included visits to plants in all categories with all levels of occupational health programs. This would include plants with less than 100 employees with first aid programs only or large plants with a well organized occupational health programs; a medical director, full or part-time, one or more registered nurses in each location or on each work shift as needed.

The visits were self-initiated or made at the request of management and/or the nursing staff. Some of the common issues and requests for assistance by the staff included the following:

a. Interest in the employmnet of a registered nurse and developing an occupational health program.

b. Assist occupational health nurses with the development and organization of a health program in industry and hospital based industrial programs.

c. Requirements for the employment of the handicapped in relation to the Federal Rehabilitation Act of 1973 and the Massachusetts amendment.

d. Requests for health promotion resources and the development of health insurance claims.

e. The legality and advisability of first aiders or other unlicensed personnel administering over-the-counter medications to employees.

f. Potential work hazards as related to pregnancy.

g. A need for educational programs on proper lifting and the prevention of back injuries.

h. Confidentiality of medical records.

Other visits included a visit with the Division's Director and a chemist for a ventilation and lighting survey as a result of medical complaints in a public school; a visit with a medical student for a formaldehyde survey at a shoe plant as a result of medical complaints by an employee; a visit with an industrial hygienist to evaluate hazards of a paint spray area and to review the work of an employee with recent high blood levels. A visit was also made with the Division's Occupational Hygiene Physician to a garment industry. The physician in cooperation with a staff member from the Harvard School of Public Health is planning to do an ergonomic study in selected garment industries.

Visits were made to the Division by representatives from an employment agency regarding the functions and responsibilities of the occupational health nurses and their utilization on a basis per diem.

The President of the Greater Boston Chapter of the Occupational Health Nurses also made a visit to the Division staff and learn of their activities.

Requests for information and literature were responded to by telephone and mail as appropriate.

A number of telephone calls have again related to the practice of giving over-the-counter medications to employees. The Massachusetts Medical Society has again been requested for an opinion as there has been no reply to an earlier letter and the Board of Medicine was contacted for their opinion or ruling. A written reply has not been received from the Board of Medicine nor from the Massachusetts Medical Society regarding the practice. The Board of Pharmacy was also contacted.

Occupational health nurses have become increasingly involved in occupational safety and many requests were made for information and referral sources on specific chemicals and toxic substances used in the workplace and the necessary medical surveillance. In addition, a large number of occupational health programs have been developed this year in hospital settings. These programs are designed to provide medical and nursing services to employees in small industries where there is no formal health program.

Health educational programs for employees and occupational health educational programs for management, physicians and nurses may also be provided in the overall services.

Meetings and seminars relating to occupational health and safety sponsored by the following associations were attended:

1. Massachusetts Occupational Health Nurses Association
2. Board of Registrations in Nursing, Medicine, and Pharmacy
3. Massachusetts Safety Council
4. American Lung Association
5. Massachusetts Nurses Association-Legislation Committee

6. Medical Foundation
7. American Cancer Association
8. Massachusetts Department of Public Health

A three day course on hearing conservation sponsored by the Boston Guild for the Hard of Hearing was also attended. This was a very comprehensive course and included disease conditions from hearing loss, methods of testing, OSHA regulations for noise control, Workmen's Compensation, and other aspects.

A conference on the health hazards of pesticides and the medical monitoring of employees in the cranberry industry was held which included presentations by the Director and the physician of the Division of Occupational Hygiene.

Field work assignment for one semester was provided for a nursing student in the graduate program at Boston University and the Occupational Health Program at the Harvard School of Public Health. One day field assignment was also provided for two additional students in the same program.

A conference was held with a member of the Division of Industrial Accidents and three other occupational health nurses from industry to discuss the processing of Workmen's Compensation claims.

A survey by mail of manufacturing Industries in Massachusetts with 100 or more employees was initiated in February, 1982. Approximately 1200 questionnaires were mailed and approximately 750 questionnaires were returned. Seventy-seven (77) questionnaires were returned from plants that were either closed or could not be located at the mailing address.

The purpose of the survey was to identify the staff members and the extent of occupational health and safety programs in the state.

The analysis included:

a. The numbers and types of industries which offer pre-employment and periodic physical examinations.

b. The degree of medical surveillance for exposure to chemical or other hazards.

c. Whether or not a physician and/or nurse is employed full or part-time and the salary ranges of nurses.

d. The number of employees certified in First Aid and the number of emergency medical technicians.

e. Whether or not there is a safety committee and the frequency of meetings.

The final data from the surveys with 100 or more employees was analyzed using the Statistical Package for the Social Sciences and an IBM computer 3081 by the graduate student at Boston University. A separate report of the results is being prepared.

RECOMMENDATIONS MADE

Type		Number	Workers Affected
Environmental		1,134	26,478
Health		161	36,143
	Total	2,295	62,621

RECOMMENDATIONS COMPLETED

Environmental		33	724
Health		3	160
	Total	36	884

ENVIRONMENTAL TESTS

Substance or Condition	Number	In Harmful Exposure Range
Physical Hazards		
Radiation		
(αβγ) Radiation	2,170	67
X-Radiation	1,221	62
Microwaves	132	0
Ultraviolet radiation	25	2
Noise	1,677	504
Ventilation	415	106
Illumination	11	9
Humidity	10	2
Chemical Hazards		
Ammonia	29	0
Arsine	1	0
Carbon Dioxide	122	8
Carbon Monoxide	398	147
Combustible Vapors, N.O.C.	34	0

ENVIRONMENTAL TESTS
(continued)

Substance or Condition	Number	In Harmful Exposure Range
Chemical Hazards (continued)		
Ethylene Oxide	11	0
Formaldehyde	16	1
Hydrogen Chloride	2	0
Hydrogen Cyanide	1	0
Hydrogen Sulfide	4	0
Isobutane	3	0
Mercury	524	56
Methane	2	0
Nitrogen dioxide	13	0
Oxide of nitrogen	22	3
Ozone	14	3
Perchloroethylene	12	2
Solvents, N.O.C.	2	0
Styrene	1	0
Sulfur Dioxide	7	2
Sulfuric Acid	1	0
Toluene	4	0
Toluene Diisocyanate	6	4
Trichloroethylene	3	1
Total	6,893	979

AIR SAMPLES COLLECTED

1. PARTICULATES

Substance		Number	Number in Harmful Range
Asbestos		101	8
Cotton Dust		7	0
Dust, N.O.C.		34	0
Fibrous Glass		5	0
Fumes, N.O.C.		2	0
Gypsum Dust		1	0
Iron		2	0
Mists, N.O.C.		1	0
Oil Mist		1	0
Silica		7	2
Welding Fumes		5	2
Wood Dust		3	0
	Total	169	12

2. CHEMICALS

Substance	Number	Number in Harmful Range
Acetic Acid	3	0
Acetone	14	0
Beryllium	4	0
Butyl Acetate	6	0
Butyl Cellosolve	6	0
Cadmium	2	0
Caprolactam	3	0
Chromium	11	0
Chromic Acid	3	0
Coal Tar Pitch Volatiles	4	0
Cresol	3	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Cyclohexanone	4	0
Dichlorobenzene	6	1
Ethyl Acetate	6	0
Ethyl Cellosolve	3	0
Ethylene Diamine	3	0
Gasoline	3	0
Hydrocarbons, N.O.C.	3	0
Isopropyl Alcohol	18	0
Lead	102	16
Methanol	5	1
Methylene Chloride	14	0
Methyl Ethyl Ketone	22	0
Methyl Isobutyl Ketone	3	0
Methyl Methacrylate	1	0
Mineral Spirits	9	0
Naphtha, N.O.C.	6	0
Organic Vapors, N.O.C.	5	0
Oxalic Acid	1	0
Perchloroethylene	11	0
Permanganate	3	0
Petroleum Distillates	5	0
Phenol	5	0
Phosphorus	2	0
Polychlorinated Biphenyls	4	0
Solvents, N.O.C.	3	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Sulfuric Acid	14	4
Styrene	3	0
Toluene	35	0
Toluene Diisocyanate	19	17
1,1,1 Trichloroethane	13	1
Trichloroethylene	7	0
Vinyl Chloride	3	0
Xylene	11	0
Total	411	40

3. GASES

Ammonia	2	0
Formaldehyde	44	0
Freon, N.O.C.	29	1
Heptane	9	0
Oxides of Nitrogen	1	0
Ozone	11	1
Sulfur Dioxide	4	0
Total	100	2

LABORATORY WORK

AIR SAMPLES		829
Chemicals	660	
Particulates	169	
MATERIAL SAMPLES		333
Chemical	70	
Microscopic	263	

SOURCE OF INQUIRY

Source	Services	Information	Total
Employer	367	161	528
Employee	80	42	122
Self-initiated	94	-	94
Follow-up	93	-	93
Division of Industrial Safety	47	1	48
Attorney	-	11	11
Health Professionals (Doctors, dentists, health agents)	87	45	132
Labor unions	82	25	107
Hospital	40	19	59
Public Facilities (Public schools, state and local agencies, etc.)	67	21	88
OSHA	-	2	2
Others (Homeowner, students, general public, Representative, university, tenants, Federal Government other than OSHA)	86	198	284
Total	1,043	525	1,568

FIELD WORK

Section	Plant Visits	Other Visits	Meetings	Talks
State Program	488	139	143	13
On-site Consultation Program	299	7	7	0
Asbestos Program	515	6	11	1
Total	1.302	152	161	14

LABORATORY WORK
(continued)

SMEAR SAMPLES		17
Chemical	17	
URINE SAMPLES		897
Hippuric Acid	3	
Mercury	894	
BLOOD TESTS		4,994
Lead	2,515	
Zinc Protoporphyrin	2,479	
PROFICIENCY ANALYTICAL TESTING PROGRAM		109
Asbestos	16	
Cadmium	16	
Lead	16	
Solvents	24	
Zinc	16	
West Allis Memorial Hospital Blood Testing Program - Lead	9	
Center for Disease Control Blood Lead	12	
TOTAL		7,179

PUBLICATIONS

1. Recommended Safe Practices--Aluminum Oxide--Mineral Data Sheet No. 8, Bulletin No. 1320, September, 1981
2. Recommended Safe Practices--Pumice--Mineral Data Sheet No. 4, Bulletin No. 1321, September, 1981.
3. Recommended Safe Practices--Granite--Mineral Data Sheet No. 6, Bulletin No. 1322, September, 1981.
4. Recommended Safe Practices--Talc--Mineral Data Sheet No. 5, Bulletin No. 1324, September, 1981.
5. Reprints of Writings of the Staff. Bulletin No. 1325, July, 1981.
6. Recommended Safe Practices--Mercury--Chemical Data Sheet No. 9, Bulletin No. 1326, August, 1981.
7. Recommended Safe Practices--Fibrous Glass--Mineral Data Sheet No. 9, Bulletin No. 1327, August, 1981.
8. Recommended Safe Practices--Trichloroethylene--Chemical Data Sheet No. 7, Bulletin No. 1328, August, 1981.
9. Recommended Safe Practices--Chromates--Chemical Data Sheet No. 5, Bulletin No. 1329, September, 1981.
10. Recommended Safe Practice Bulletins Currently Available for Distribution, Bulletin No. 1330, October, 1981.
11. Amended OSHA Noise Standard, Bulletin No. 1331, September, 1981.
12. Recommended Safe Practices--Lead-- Chemical Data Sheet No. 14, Bulletin No. 1332, November, 1981.
13. Recommendations for Dental Offices, Bulletin No. 1333, December, 1981.
14. Recommended Safe Practices--Parathion--Chemical Data Sheet No. 32, Bulletin No. 1334, December, 1981.
15. Significance of Urinary Mercury Concentration in MAC (TLV) for Mercury Vapor, Bulletin No. 1335, January, 1982.
16. The Occupational and Environmental Health History, Bulletin No. 1336, December, 1981.
17. Tank Painting Hazards. Bulletin No. 1337, March, 1982.
18. History of Massachusetts Asbestos Commission. Bulletin No. 1338, March, 1982.
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DIVISION OF OCCUPATIONAL HYGIENE
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ANNUAL REPORT

1983

Originating Office

Department of Labor and Industries, Division of Occupational Hygiene

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1983 ANNUAL REPORT OF THE DIVISION OF OCCUPATIONAL HYGIENE

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ANNUAL REPORT
OF THE
DIVISION OF OCCUPATIONAL HYGIENE
FISCAL YEAR 1983

This Annual Report records the program and activities of the Division of Occupational Hygiene, of the Department of Labor and Industries for the fiscal year beginning July 1, 1982.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES".

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Leonard D. Pagnotto, M.S., C.I.H., Director
Richard Levine, B.S., Assistant Director
Rose H. Goldman, M.D., Occupational Hygiene Physician
Patricia Circone, B.S., Chief of Laboratory
Rexford G. Alexander, M.S., C.I.H., Chief of Engineering Services
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Linda E. Tremblay, B.S., Senior Chemist
Janice LaMalva, M.A., Senior Chemist
Virginia M. Summers, R.N., M.S., Supervising Occupational Hygiene Nurse
Erwin Allen, B.S., (CH Eng) Senior Chemist
Joel P. Weddig, B.S., Assistant Industrial Sanitary Engineer
Frank M. Kramarz, B.S., Assistant Industrial Hygiene Engineer
Richard V. Grillo, M.S., Assistant Chemist
Joseph LaMalva, M.S., Assistant Chemist
Bonnie Weeks, M.S., Assistant Chemist
Robert H. Kenrick, B.S., Senior Chemist
Bernice Linde, B.S., Administrative Assistant
Claudia Kelly, M.L.S., Head Clerk
Mary S. Lim, Senior Library Assistant
Elizabeth Horton, Senior Clerk Stenographer
Eleanor Sullivan, Senior Clerk Typist
Cris Ericson, Senior Clerk Typist
Rea Fulkerson, Senior Clerk Typist

The following personnel changes occurred during Fiscal 1983:

On June 27, 1982, Patricia Circone was promoted from the position of Senior Chemist to the position of Chief of Laboratory and Joel P. Weddig was promoted from the position of Assistant Industrial Hygiene Engineer to the position of Senior Chemist.

On August 16, 1982, Joseph LaMalva, M.S., joined the Asbestos Program as an Assistant Chemist.

On August 23, 1982, Linda Tremblay was granted a leave of absence from her position.

On October 31, 1982, Janice LaMalva transferred from the Asbestos Program to the State Program as a Senior Chemist.

On November 1, 1982, Eleanor Sullivan transferred to the Division of Industrial Safety.

On November 11, 1982, Elizabeth Horton started in the position of Senior Clerk and Stenographer.

On November 21, 1982, Robert Kenrick, Jr., B.S., started as an Assistant Chemist in the State Program.

On December 26, 1982, Joel P. Weddig was promoted from the position of Senior Chemist to the position of Senior Industrial Sanitary Engineer, and Robert Kenrick, Jr., was promoted from the position of Assistant Chemist to the position of Senior Chemist.

On December 30, 1982, Cris Ericson started in the position of Senior Clerk-Typist.

On January 2, 1983, Bonnie L. Weeks, M.S., joined the Asbestos Program as an Assistant Chemist.

On January 3, 1983, Elizabeth Horton resigned from the position of Senior Clerk and Stenographer and Rea M. Fulkerson started as a Senior Clerk-Typist.

On January 8, 1983, Cris Ericson resigned from her position of Senior Clerk-Typist.

On May 31, 1983, Linda Tremblay, on a leave of absence, resigned from the position of Senior Chemist.

The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by the legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of industrial health problems.

The Division is divided administratively into an Engineering Section, a Chemical Section including a laboratory, a Medical and Nursing Section, and an Information Section.

GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston. The Division occupies approximately 6,150 square feet at this location. The Division has made plans to move its offices and laboratory to 1001 Watertown Street, West Newton sometime in February, 1984.

A total of 1,587 services were undertaken, including 259 requests for information on matters pertaining to occupational health. These services required a total of 1,290 plant visits, 34 visits to other agencies, and 4 talks and lectures by the Division staff. This is a decrease over 1982 of less than 170 for plant visits due to the fact there were position vacancies.

Field studies involved 8,277 measurements of particulate environmental conditions and the collection and analysis of 530 chemical, 287 air samples, and 118 gas samples in places of employment. In addition, the laboratory evaluations included the analysis of 827 air samples, 762, urine samples, 2,291 material samples, 5,265 blood samples, 150 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U. S. Department of Health and Human Services, and analyzed 96 simulated air samples for asbestos, lead, cadmium, zinc and solvents with West Allis Memorial Hospital for 3 blood samples and with the Center for Disease Control for 12 blood samples.

The plant studies and visits resulted in more than 2,661 recommendations potentially affecting 140,796 workers.

7(c)(1) ON-SITE CONSULTATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7(c)(1) On-Site Consultation Program sponsored by the U. S. Department of Labor, Occupational Safety and Health Administration (OSHA), which provides on-site consultation and in health and safety matters at the employers' requests.

The Division of Occupational Hygiene provides Health Consultants for the solution of industrial hygiene problems in the private sector by the detection, evaluation and control of existing and potential health hazards resulting from occupational exposures.

During Fiscal 1983, 298 requests were received from employers for this free consultation service. Our staff of health consultants completed a total of 270 surveys which included complete and special hazard inspections and evaluations.

The entire consultation staff attended and completed a number of training courses given by the OSHA school in Illinois. These courses are in-depth studies of the several different aspects of industrial hygiene, such as ventilation, noise, and hazardous materials.

The program has a large backlog of requests from all types of industries in Massachusetts.

We have received several letters from employers complimenting this voluntary consultative service.

The 7(c)(1) On-Site Consultation Program continues as a desirable program for this Division and for the employers in this Commonwealth. A total of 1,240 environmental analyses and 73 ventilation studies were performed. A total of 432 air samples were collected.

ASBESTOS PROGRAM

The Asbestos Program has been concerned with the disease-causing potential of exposure to airborne asbestos in schools and public buildings. The concern derives from epidemological evidence linking airborne asbestos by asbestos workers to various types of cancer and nonmalignant respiratory diseases. The Division of Occupational Hygiene, Environmental Protection Agency, National Institute for Occupational Safety and Health and the scientific community believe that any level of exposure to asbestos involves some health risk, although the exact degree of risk cannot be reliably estimated.

Children and young adults who are exposed to asbestos have a greater chance than older people of developing certain asbestos-related diseases due to a longer remaining lifespan during which disease may develop. Also smokers exposed to asbestos are at greater risk than nonsmokers with a similar level of exposure.

It is because of this reason that schools are a number one priority in the Asbestos Program.

Asbestos Program History

In recognition of the fact that the use of asbestos in public buildings and schools is a potential health hazard, a special legislative commission was established under Chapter 58 of the Resolves of 1975, to investigate and evaluate the extent of asbestos exposure in the public schools and public buildings in Massachusetts.

The mandate for the Asbestos Commission was to "evaluate the extent of the use of asbestos as fireproofing in the public schools and public buildings of the Commonwealth and its containment and removal". The scope of the project was limited to "spray-on" coating under the assumption that it was this type of material which had the greatest potential for generating airborne fibers.

The role of the Asbestos Commission was primarily consulting and administrative. The Asbestos Program was technical in nature and gradually assumed the functions of the Asbestos Commission making the operation more efficient. Since the Asbestos Program accepted this additional responsibility it has gathered additional information and valuable experience in assessing the need for corrective action and in controlling the release of fibers from asbestos containing material.

Although most of the Program's concern is directed toward the 2,400 public schools, it also has the responsibility of assessing approximately 10,000 public buildings. As of this writing the Asbestos Program has a staff of three.

The Asbestos Program offers a comprehensive assessment program. This program includes inspection and identification of friable material, bulk and air sampling, exposure assessment and current methods of corrective action.

EPA Ruling: Friable Asbestos Material in Schools. Effective June 28, 1982, the EPA has issued a ruling on "Friable Asbestos Containing Materials in Schools: Identification and Notification". This rule requires public and private elementary and secondary schools in the United States to identify friable asbestos-containing building materials, maintain records and notify employees of the location of the friable materials which contain asbestos, provide the employees with instructions on reducing exposures to asbestos, and notify the school's parent-teacher association of the inspection results.

The Asbestos Program received many requests from administrators and principals indicating a general misunderstanding of their responsibility and the rule requirements. The rule did not require duplication of the extensive inspection and analytical services provided by the Asbestos Program, but did require inspection of areas not previously inspected or sampled by the Commonwealth. The Asbestos Program in conjunction with the EPA and the School Building Assistance Bureau of the Department of Education established a series of six training sessions designated to aid local educational agencies to meet the requirements of this rule. There was a tremendous response for these sessions with requests for additional sessions.

Largely due to this rule the Asbestos Program staff analyzed over 2,000 bulk samples, 255 air samples, and completed 825 surveys.

Chapter 2 of the Sanitary Code: Minimum Standard of Fitness for Human Habitation

The Asbestos Program is presently working with the Department of Public Health, the Environmental Protection Agency and the Massachusetts Consumers Council in developing an amendment to the State Sanitary Code. The purpose of this proposed amendment is to minimize exposure to asbestos dust in dwellings. The amendment deals with one common and easily identified source of such dust: Asbestos-containing insulation in pipes, boilers, and furnaces.

Chapter 651

Recently, through Chapter 651 of the Acts of 1982, the legislature unfroze 1.38 million dollars in previously appropriated funds for removal or encapsulation of asbestos in public schools, with first priority going to those projects determined by the Asbestos Program to be most hazardous.

Senate No. 1892

This bill, if passed, would provide grants to reimburse cities, towns, and regional school districts for the removal, encapsulation or containment of asbestos found in public school buildings.

Asbestos Disposal

Asbestos disposal is regulated by the Federal Environmental Protection Agency, the Massachusetts Department of Environmental Quality

Engineering, and local boards of health. The Asbestos Program staff has included a provision for safe asbestos disposal at an approved landfill site in its suggested safe practice bulletin dealing with asbestos removal contracts. However, the great amounts of publicity about the dangers of asbestos have made towns reluctant to accept asbestos even at EPA and DEQE approved sites. This has made legal disposal the most difficult part of asbestos abatement.

SCHOOL ASBESTOS RESEARCH GROUP (SARG)

The Division is participating in a research study to determine the effects of asbestos exposure in Massachusetts Public Schools. The target group will be teachers and custodial personnel. Other members of the research group include representatives from Massachusetts General Hospital, Public Health, Health Statistics and Research, Harvard School of Public Health and Boston University School of Public Health.

CANCER ALERT IN PUBLIC LIBRARY

Our agency was notified of a report that five library employees had contracted cancer over the past seven years. A Public Health Epidemiologist indicated that this was considered higher than expected. Several types of cancer were involved, including breast, liver and colon carcinoma.

A request was received for air tests to be performed in the library. Our findings did not reveal the presence of any unusual environmental contaminants.

It was concluded that although the incidence of cancer was high, it was unlikely that environmental conditions in the library were directly responsible.

SCHOOL HOUSE VENTILATION PROBLEM

The Division was requested to investigate complaints from pupils, parents and teachers about the quality of the air in an elementary school. Another issue at this school was an alleged increasing trend in birth defects and miscarriage among the female staff. This problem is being studied by the Massachusetts Public Health Department. Air tests and ventilation measurements were made throughout the school. In addition light intensity measurements were made at desk top levels in all classrooms.

Air test results were essentially negative, light intensity was considered adequate, and gas chromatographic analysis of charcoal samples showed no contaminants present. The ventilation system, however, appeared to be inadequate. The amount of fresh air, supplied per occupant to the classrooms, did not meet the Massachusetts Building Code regulations. A recommendation was made to correct this situation.

POOR AIR QUALITY IN A PUBLIC LIBRARY

The Division was requested to investigate complaints by employees of stale air in a public library. Air tests and ventilation measurements were made. No contaminants were detected in the air. It was determined by measurements that the air supply was inadequate. Calculations showed that less than 10% fresh air was being introduced into the system. The Massachusetts Building Code requires at least 15% of the air circulated be fresh outside air. A recommendation was made to increase the supply of fresh air to correct this situation.

FOLLOW-UP OF A STATE POLICE CAR OF A TROOPER WHO SUFFERED FROM CARBON MONOXIDE OVEREXPOSURE

The monthly report for January, 1982, reported on "The Overexposure of State Policeman to Carbon Monoxide". Car No. 217 showed abnormal levels of carbon monoxide and it was recommended that the exhaust system and floorboards be rechecked for leaks. No leaks or problems were found but the carburetor was replaced.

On August 19, 1982, Car No. 217 was rechecked for CO levels and all interior tests were normal.

CANCER SCARE AT PUBLIC LIBRARY - FINAL REPORT

The Division investigated a report of an increased incidence of cancers among library employees over a span of five years. Epidemiologists who studied the situation have concluded that the number of cancers was indeed high. The Division surveyed the environment and tested the ventilation system. Chemical tests did not reveal the presence of toxic airborne contaminants. No evidence was found from the chemical tests that this library air was a factor in these cases. However, it was found that the library has an inadequate fresh air supply. In addition, the fresh air intake was located at street level near a busy side street. The potential exists with this arrangement for exhaust fumes to be drawn into the ventilation system of the library.

The installation of air exhaust fans was recommended for an area where a mobile library van was garaged.

FORMALDEHYDE EXPOSURE FROM PLYWOOD LAMINATE

The Division was requested to investigate a situation in a nearly complete warehouse where 15 construction workers were sent to the hospital with complaints of severe eye, throat and respiratory irritation. Our investigation revealed that a plywood laminant used for flooring on a mezzanine level was releasing formaldehyde. Tests showed formaldehyde concentrations of 2-4 ppm in the warehouse environment. Formaldehyde levels of these magnitudes are capable of causing the symptoms reported. It was recommended that the warehouse ventilation system be operated continuously until all of the gassing from the laminate was complete. Formaldehyde levels found on a return visit with the ventilation system on were found to be under control. No further complaints have been received from the workers.

CHEMICAL EXPOSURE AT A YWCA SWIMMING POOL

The Division was requested to investigate complaints of eye and skin irritation by individuals using a recently repainted indoor swimming pool. Initial test results showed the presence of benzaldehyde and ethyl benzene in pool water. Exposure to these chemicals have been known to cause irritant effects similar to those reported.

The pool workers reported the polyester paint used was still not fully dry shortly before the pool was filled. It is theorized that an organic solvent released by the incompletely cured paint or a reaction product was responsible for the reported irritations.

A series of drainings and refillings as well as additional drying time were needed to fully dry the paint and prevent recurrence of irritant effects.

ENVIRONMENTAL TESTS AT THE MC CORMACK BUILDING - 1 ASHBURTON PLACE

Over the past several years the Division has received many complaints from various Departments about the quality of the air at the McCormack Building. These complaints were investigated, but no adequate solution has been achieved so far. In view of this, the Division has instigated an investigation of the entire building which will include air testing, ventilation measurements and other tests. The investigation is expected to take several weeks to complete, at the end of which specific recommendations will be made to the appropriate authorities.

DIVISION STAFF MEMBER ATTENDS COURSE AT THE HARVARD SCHOOL OF PUBLIC HEALTH

Assistant attended Harvard School of Public Health to take part in a 5-day course on the Fundamentals of Industrial Hygiene. Nearly 30 individuals from throughout the United States including Alaska were enrolled in the course. The participants had mixed backgrounds ranging from administration personnel to Safety and Health Professionals.

STAFF MEMBER LECTURES ON PARATHION POISONING

The Director was invited to speak on parathion poisoning to Cranberry Growers. He spoke on parathion poisoning at a conference attended by Cranberry Growers in the Cape Cod Area. The specific topic of discussion was a review of the circumstances that led up to the fatal parathion poisoning of two young farm hands.

Three cardinal rules for handling toxic pesticides were violated. The workers (1) did not practice proper hygiene (2) wore no respiratory protection and (3) proper protective clothing was absent.

In addition to all this, the workers were not informed of the toxicity of the insecticide they were using. A considerable delay occurred before treatment was started because this information was not available when the workers were brought to the hospital. One of the farm workers had to return to the field and bring back an empty bag of the material that was sprayed. The delay was fatal because treatment was administered too late. The two workers developed the classical symptoms of parathion poisoning and died within two hours after onset of illness.

TEMPERATURE PROFILE STUDY OF MC CORMACK BUILDING

The Division received many complaints about the quality of the air in the McCormack Building. Earlier this year, ventilation measurements on the main air handling systems showed that the fresh air supply for the building appeared to be adequate. Tests were conducted to establish a temperature profile of the building. In order to do this, twenty (20) thermometers were strategically located throughout this building. Temperature readings were made twice each day, morning and afternoon. In addition, relative humidity and carbon dioxide levels were determined. The testing program continued for at least four weeks. All the results were evaluated after the testing period was completed in an attempt to determine the cause of so many complaints by occupants of the McCormack Building.

GASOLINE CONTAMINATION OF A MUNICIPAL SEWERAGE SYSTEM

A request was made to investigate the presence of a chemical odor in the basement of a school, a private home and a sewerage plant located in a south shore community.

A chemical odor was determined to be gasoline from a gasoline station which had a leak in one of the fuel tanks. The fuel had seeped into the sewer system and contaminated it. The presence of gasoline vapor was detected by air tests and water analysis in the locations mentioned above which are situated along the contaminated sewer line. The damaged tank was removed and replaced. No further problems from chemical odors were reported.

TEMPERATURE PROFILE OF MC CORMACK BUILDING

Our Agency has completed a temperature profile of the McCormack Building and the data is being analyzed. The study was prompted by numerous complaints from occupants about the quality of the air in this building. Preliminary findings indicated that some of the rooms in the building become quite warm in the afternoon and cause discomfort to the occupants. In addition relative humidity in most areas was quite low contributing to the discomfort of the workers.

A second phase of this study was started when the warm weather arrived when historically frequency of complaints about air quality is the highest.

NAPHTHALENE EXPOSURE ON A TUNNEL CONSTRUCTION SITE

Two workers experienced irritation and illness from an exposure to chemical or chemicals on a tunnel construction site near a chemical plant. Tests on soil, and water from the site were performed by our Division and it was learned that they contained trace amounts of naphthalene. The chemical was at one time extensively used in the chemical plant and the reactor residual was dumped in the backyard. The chemical apparently has, over the years, seeped into soils and contaminated the general area. At the time of this visit the chemical odor was not noticeable. It was suspected that there was a fresh disposal of the chemical on the day the men were affected. No further complaints were received from the tunnel workers.

ASBESTOS EXPOSURE AT THE MIDDLESEX COUNTY COURT HOUSE

The Division was requested to investigate the potential asbestos exposure of occupants of the Middlesex County Court House. Over thirty air tests were made in various locations throughout the multistoried building. No significant asbestos exposures were found. It was reported, however, that a sprinkler alarm system was soon to be installed in the building. The work, it was feared, would disturb the asbestos sprayed on the ceiling structures. Our Division agreed to sample the air during a simulated work session to determine the full extent of any asbestos contamination. These tests are expected to be performed in the near future.

CARBON MONOXIDE EXPOSURE IN A POLICE VEHICLE

Police officers complained about untoward effects while driving in a police cruiser. Our Division was requested to investigate the situation. Air tests for carbon monoxide inside the cruiser with the engine running and the windows closed reached a maximum of 55 ppm. The level rose considerably higher when the windows were open. It was learned that the engine was operating on a very rich mixture causing a considerable amount of carbon monoxide which found its way to the inside of the automobile. After the fuel mixture was adjusted, the carbon monoxide levels were reduced to zero.

RIGHT-TO-KNOW BILL

The Division was named as the Lead Agency in a Legislative Bill designed to provide information concerning industrial chemicals to workers exposed to them. The bill calls for cooperation among three agencies including Public Health, Department of Environmental Quality Engineering and the Department of Labor and Industries. Information on chemicals will be collected by local communities and relayed to State Agencies where it will be computerized and made available, not only to workers, but community groups. The bill if passed and funded by the Legislature will permit a substantial increase in the number of Division personnel. Consolidation of chemical information has been needed for a very long time.

DIESEL FUMES IN A FIRE HOUSE

Our agency was requested to determine the extent of contamination existing in the living quarters of a fire station. The source of the diesel fumes was fire engine exhaust. Tests were taken for carbon monoxide and nitrogen dioxide in the second floor kitchen area of the fire house. Our findings showed significant amounts of these gases were present but concentrations were not excessive. Recommendations, however, were made to reduce the existing contamination as much as possible by installing ventilation fans in appropriate locations in the fire house.

SOCIAL SERVICE OFFICE CONTAMINATED WITH PERCHLOROETHYLENE FUMES

The social service office in question was located next door to a dry cleaning store. Request was made to our Division to evaluate the perchloroethylene contamination which found its way from the cleaning shop to the social service office through wall openings. The dry cleaning shop had exhaust ventilation but it was found inadequate. A recommendation was made that additional ventilation be provided to the cleaning shop so the exhaust air could be directed away from the social service office.

ASBESTOS CONTAMINATION OF OFFICE AREA

The Division was requested to investigate asbestos contamination of a business office. The beams and steel structures above the dropped ceiling contained sprayed-on Amosite Asbestos.

During the course of making electrical alterations in the plenum a considerable amount of the asbestos was disturbed and dropped to the office area below. Upon notification of this incident, the work in progress was halted until proper procedures were instituted. A conference was held with the building management to discuss this problem and guidelines for controlling future situations of this kind were outlined.

LECTURE PRESENTED IN ROME, ITALY

The Director of the Division presented a lecture on environmental standards at the Catholic University of the Sacred Heart in Rome. Approximately 100 staff members and medical students attended the lecture. The subject matter was of immense interest to the attendees.

The Director also visited the University of Rome and government health offices of the Istituto Superiore di Sanita in Rome. An exchange of information on occupational health matters was the highlight of these visits.

CRANBERRY GROWER PESTICIDE AND HEALTH MONITORING PROGRAM

A pilot program of monitoring for possible overexposure to organophosphate pesticides in cranberry growers has been started by a nurse of Carver Public Health Nurse Committee and the Occupational Health Physician of Division of Occupational Hygiene. Forty-one growers volunteered to participate in the program, which consisted of testing Acetylcholinesterase (ACH ase) levels and completing a questionnaire on five occasions during summer of 1983. All growers used safety measures such as respirators, rubber gloves and rubber boots when applying the pesticide. Only two persons on one testing day, and three persons on another day experienced a drop in ACH ase level more than 25%.

Plans are being made to expand the monitoring program in 1984, and to follow-up the test results with corrective measures for pesticide application, when indicated.

NURSING ACTIVITIES

Plant visits were made to occupational health units in diversified plants with a range of 90 to 7,000 employees and an average of 1,000. The health units were staffed primarily by one registered nurse on-site and a consulting physician at an off-site location. The visits were self-initiated or made at the request of management or the nursing staff.

Eight hospital based occupational health units were newly developed and visited which shows the increase of occupational health in the hospital setting.

The hospital-based programs are also staffed initially by one nurse who may or may not have had experience in occupational health. The purpose of these units is to provide emergency care, pre-placement and medical examinations and other health services upon request. Several of the units have established continuing education programs for occupational health nurses in industrial settings. There is an increasing need for physicians with an occupational health specialty in the hospital programs.

A visit was made with the Division Director and hygienist to monitor the ventilation and lighting system in a public school because of medical symptoms reported by school staff members.

Requests for assistance concentrated on the newly employed nurse and included a discussion of the role of the nurse, physician and management, medical needs, library references and available resources for occupational health and safety. Applicable state and federal laws on nursing, discrimination, workmen's compensation, occupational health and safety and the consultation services available at a state and federal level were also reviewed.

There were many requests received by telephone for information and included the need for medical directives for nurses in occupational health, confidentiality of medical records, employment of the handicapped and the Massachusetts proposed discrimination law and the Right-to-Know law.

Requests on the legality of the administration of over-the-counter medications to employees by unlicensed personnel continue to be received. A task force was, therefore, established by the Division nurse in January, 1983, in an attempt to establish guidelines or recommendations regarding this practice. The committee included an attorney, pharmacist, a staff member from the American Red Cross, occupational health nurses and occupational health physicians.

Meetings and seminars relating to occupational health and safety sponsored by the following associations were attended to keep updated on issues and trends in the field:

Massachusetts Occupational Health Nurses Association
Massachusetts Safety Council
Massachusetts Nurses Association - Legislative Committee
American Cancer Association
Massachusetts Department of Public Health
Hearing Conservation Groups.

The annual convention of the American Association of Occupational Health Nurses was attended in Washington, D.C. This was an excellent convention and is an important convention to attend and convene with other nurses and consultants in the field. The theme of the conference was on the need for research in occupational health nursing.

Analysis of the survey initiated in 1982 has been completed and it is expected that a final report will be ready within a short time.

Classes in occupational health were given to registered nurse students at a local college and a total of 10 students were placed in industrial occupational health settings as part of a management course.

SOURCE OF INQUIRY

Source	Services	Information	Total
Employer	86	83	169
Employee	50	16	66
Self-initiated	145	--	145
Follow-up	180	--	180
Division of Industrial Safety	12	--	12
Attorney	2	10	12
Health Professionals (Doctors , dentists, health agents)	26	65	91
Labor unions	34	2	36
Hospital	5	7	12
Public Facilities (Public schools, state and local agencies, etc)	256	53	309
OSHA	--	2	2
Others (Homeowner, students, general public, Representative, university, tenants, Federal Government other than OSHA)	9	121	130
Total	915	259	1,164

FIELD WORK

Section	Plant Visits	Other Visits	Meetings	Talk
State Program	603	17	89	4
On-site Consultation Program	276	14	45	0
Asbestos Program	411	3	15	-
Total	1,290	34	149	4

RECOMMENDATIONS MADE

Type		Number	Workers Affected
Environmental		2,425	101,304
Health		236	39,492
	Total	2,661	140,796

RECOMMENDATIONS COMPLETED

Environmental		87	1,074
Health		--	--
	Total	87	1,074

ENVIRONMENTAL TESTS

Substance or Condition	Number	In Harmful Exposure Range
Physical Hazards		
Radiation		
(αβγ) Radiation	3,061	94
X-Radiation	1,090	24
Microwaves	313	3
Ultraviolet radiation	3	1
Non-ionizing (VDT)	254	6
Noise	552	73
Ventilation	688	98
Illumination	15	0
Humidity	325	166
Temperature	26	0
Chemical Hazards		
Acetic acid	1	0
Ammonia	10	0
Asbestos	21	0
Carbon Dioxide	703	22
Carbon Monoxide	501	64

ENVIRONMENTAL TESTS
(continued)

Substance or Condition	Number	In Harmful Exposure Range
Chemical Hazards (continued)		
Chlorine	4	0
Chlorine Dioxide	2	0
Combustible Vapors, N.O.C.	66	3
Cutting Oil	1	0
Ethylene Oxide	54	4
Formaldehyde	43	2
Hydrocarbons	47	0
Hydrogen Chloride	13	1
Hydrogen Cyanide	9	1
Hydrogen Sulfide	6	0
Isocyanates	20	0
Mercaptans	2	0
Mercury	256	5
Methylene Chloride	2	0
Nitrous Oxide	107	40
Oxide of Nitrogen	28	1
Ozone	17	5
Perchloroethylene	7	1
Phosgene	1	0
Styrene	5	0
Sulfur Dioxide	8	0
Toluene Diisocyanate	8	0
1,1,1 Trichloroethane	4	0
Trichloroethylene	4	0
Total	8,277	617

AIR SAMPLES COLLECTED

1. PARTICULATES

Substance	Number	Number in Harmful Range
Asbestos	245	9
Dust, N.O.C.	36	2
Fumes, N.O.C.	1	0
Oil Mist	11	1
Silica	3	0
Wood Dust	1	0
Total	297	12

2. CHEMICALS

Acetic Acid	1	0
Acetone	8	0
Acrylonitrile	1	0
Amyl Acetate	1	0
Antimony	3	0
Benzene	2	0
Butyl Acetate	9	0
Butyl Alcohol	10	0
Cadmium	7	0
Carbon Tetrachloride	1	0
Cellulose Acetate	8	0
Chromium	9	0
Copper	4	1
Cresol	2	0
Cresylic Acid	2	0
Cyclohexanone	7	0
Diethylamine	4	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Dimethyl Formamide	13	4
Epichlorhydrin	1	0
Ethanol	6	0
Ethyl Acetate	9	0
Gasoline	10	0
Isobutyl Acetate	7	0
Isopropyl Alcohol	8	2
Lead	85	34
Methanol	27	1
Methylene Chloride	19	0
Methylenebisphenyl Isocyanate (MDI)	1	0
Methyl Ethyl Ketone	23	4
Methyl Isobutyl Ketone	5	0
Mineral Spirits	3	0
Naphtha, N.O.C.	14	0
Organic Vapors, N.O.C.	33	0
Perchloroethylene	19	1
Permanganate	3	0
Petroleum Distillates	18	1
Phenol	2	0
Polychlorinated Biphenyls	8	0
Selenium	2	0
Silver	5	0
Sodium hydroxide	2	0
Sulfuric Acid	3	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance		Number	Number in Harmful Range
Stannic Chloride		5	0
Styrene		7	0
Toluene		38	2
Toluene Diisocyanate (TDI)		5	0
1,1,1 Trichloroethane		18	9
Trichloroethylene		11	2
Xylene		34	3
Zinc		7	2
	Total	530	57

3. GASES

Substance		Number	Number in Harmful Range
Ethylene Oxide		3	1
Formaldehyde		96	2
Freon, N.O.C.		6	0
Ozone		16	4
	Total	118	6

LABORATORY WORK

AIR SAMPLES		827
Chemicals	530	
Particulates	297	
MATERIAL SAMPLES		2,291
Chemical	41	
Microscopic	2,250	
URINE SAMPLES		762
Hippuric Acid	30	
Mercury	732	

LABORATORY WORK
(continued)

BLOOD TESTS		5,265
Lead	2,634	
Zinc Protoporphyrin	2,631	
PROFICIENCY ANALYTICAL TESTING PROGRAM		111
Asbestos	16	
Cadmium	16	
Lead	16	
Solvents	32	
Zinc	16	
West Allis Memorial Hospital Blood Testing Program - Lead	3	
Center for Disease Control Blood Lead	12	

PUBLICATIONS

1. Recommended Safe Practices--Aluminum Oxide--Mineral Data Sheet No. 8, Bulletin No. 1320, September, 1981
2. Recommended Safe Practices--Pumice--Mineral Data Sheet No. 4, Bulletin No. 1321, September, 1981.
3. Recommended Safe Practices--Granite--Mineral Data Sheet No. 6, Bulletin No. 1322, September, 1981.
4. Recommended Safe Practices--Talc--Mineral Data Sheet No. 5, Bulletin No. 1324, September, 1981.
5. Reprints of Writings of the Staff. Bulletin No. 1325, July, 1981.
6. Recommended Safe Practices--Mercury--Chemical Data Sheet No. 9, Bulletin No. 1326, August, 1981.
7. Recommended Safe Practices--Fibrous Glass--Mineral Data Sheet No. 9, Bulletin No. 1327, August, 1981.
8. Recommended Safe Practices--Trichloroethylene--Chemical Data Sheet No. 7, Bulletin No. 1328, August, 1981.
9. Recommended Safe Practices--Chromates--Chemical Data Sheet No. 5, Bulletin No. 1329, September, 1981.
10. Recommended Safe Practice Bulletins Currently Available for Distribution, Bulletin No. 1330, October, 1981.
11. Amended OSHA Noise Standard, Bulletin No. 1331, September, 1981.
12. Recommended Safe Practices--Lead-- Chemical Data Sheet No. 14, Bulletin No. 1332, November, 1981.
13. Recommendations for Dental Offices, Bulletin No. 1333, December, 1981.
14. Recommended Safe Practices--Parathion--Chemical Data Sheet No. 32, Bulletin No. 1347, March, 1983.
15. Significance of Urinary Mercury Concentration in MAC (TLV) for Mercury Vapor, Bulletin No. 1335, January, 1982.
16. The Occupational and Environmental Health History, Bulletin No. 1336, December, 1981.
17. Tank Painting Hazards. Bulletin No. 1337, March, 1982.
18. History of Massachusetts Asbestos Commission. Bulletin No. 1338, March, 1982.
19. Exposure to Lead from the Mystic River Bridge: The Dilemma of Deleading, Bulletin No. 1339, March, 1982.

MASS. MA13.1: 984

PREVENTION

DETECTION EVALUATION

CONTROL

Annual Report 1984

THE COMMONWEALTH OF MASSACHUSETTS

Michael S. Dukakis, *Governor*

EXECUTIVE OFFICE OF LABOR
Paul J. Eustace, *Secretary*

DEPARTMENT OF LABOR AND INDUSTRIES
George W. Ripley, *Commissioner*

DIVISION OF OCCUPATIONAL HYGIENE
Leonard D. Pagnotto, C.I.H., *Director*

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REPORT OF THE DIVISION OF OCCUPATIONAL HYGIENE

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ANNUAL REPORT

OF THE

DIVISION OF OCCUPATIONAL HYGIENE

FISCAL YEAR 1984

This Annual Report records the program and activities of the Division of Occupational Hygiene, of the Department of Labor and Industries for the fiscal year beginning July 1, 1983.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES".

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It hall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Leonard D. Pagnotto, M.S., C.I.H., Director
Richard Levine, B.S., Assistant Director
Rose H. Goldman, M.D., Occupational Hygiene Physician
Patricia Circone, B.S., Chief of Laboratory
Rexford G. Alexander, M.S., C.I.H., Chief of Engineering Services
Joel P. Weddig, B.S., Senior Industrial Sanitary Engineer
Frank M. Kramarz, B.S., Senior Industrial Sanitary Engineer
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Virginia M. Summers, R.N., M.S., Supervising Occupational Hygiene Nurse
Janice LaMalva, M.A., Senior Chemist
Erwin Allen, B.S., (CH Eng) Senior Chemist
Richard V. Grillo, M.S., Senior Chemist
Robert H. Kenrick, B.S., Senior Chemist
Mark Malchik, M.S., Assistant Industrial Hygiene Engineer
Rodene DeRice, M.S., Assistant Industrial Hygiene Engineer
Patti Pendexter, B.S., Assistant Industrial Hygiene Engineer
Patricia D'Apolito, M.S., Assistant Industrial Hygiene Engineer
Ernest Kelley, M.S., Assistant Industrial Hygiene Engineer
Elise P. Morse, M.S., Assistant Industrial Hygiene Engineer
Kathleen Harvey M.P.H., Assistant Industrial Hygiene Engineer
Christopher Geiger M.S., Assistant Industrial Hygiene Engineer
Bonnie Weeks, M.S., Assistant Chemist
Bernice Linde, B.S., Administrative Assistant
Claudia Kelly, M.L.S., Head Clerk

Sylvia B. Golub, Principal Clerk
Mary S. Lim, Senior Library Assistant
Rea Fulkerson, Senior Clerk Typist

The following personnel changes occured during Fiscal 1984:

Michael Kissel joined our staff on August 8, 1983 as a Northeastern University undergraduate co-op intern.

Mark Malchik joined the Asbestos Program as an Assistant Industrial Hygiene Engineer on January 3, 1984. Rodene DeRice joined the Asbestos Program as an Assistant Industrial Hygiene Engineer on January 8, 1984. Patti Pendexter transferred to the Asbestos Program from the Department of Public Health as an Assistant Industrial Hygiene Engineer on January 10, 1984.

The Division of Occupational Hygiene has moved from its office at 39 Boylston Street, Boston to 1001 Watertown Street, West Newton on February 22, 1984.

Sylvia Golub transferred from the Division of Administration of the Department Labor and Industries as a principal clerk in the Asbestos Program. Bonnie L. Weeks transferred from the Asbestos Program to the 7 (c)(1) Consultation Program as a Senior Chemist on February 26, 1984.

Joseph LaMalva transferred from the Asbestos Program to the 7(c)(1) Consultation Program as a Senior Chemist on March 4, 1984.

Patricia D'Apolito joined the Asbestos Program on April 1, 1984 as an Assistant Industrial Hygiene Engineer.

Ernest Kelley joined the Asbestos Program on April 1, 1984 as an Assistant Industrial Hygiene Engineer.

Elise P. Morse, M.S., joined the Division on May 20, 1984 as an Assistant Industrial Hygiene Engineer.

Kathleen Harvey, M.P.H., joined the Asbestos Program on May 20, 1984 as an Assistant Industrial Hygiene Engineer.

Christopher Geiger, M.S., joined the Asbestos Program on June 19, 1984 as an Assistant Industrial Hygiene Engineer.

GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston, until February 22, 1984. Occupying approximately 6,150 square feet at this location. The Division moved its offices and laboratory to 1001 Watertown Street, West Newton on February 22, 1984. The Division occupies approximately 4700 square feet at the new location and plans to expand to 6200 square feet in March of 1985.

A total of 2,161 services were undertaken, including 415 requests for information on matters pertaining to occupational health. These services required a total of 1,673 plant visits, 65 visits to other agencies, and 8 talks and lectures by the Division staff.

Field studies involved 7,953 measurements of particulate environmental conditions and the collection and analysis of 476 chemical, 407 air samples, and 88 gas samples in places of employment. In addition, the laboratory evaluations included the analysis of 883 air samples, 906 urine samples, 1,249 material samples, 5,319 blood samples, 18 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health and Human Services, and analyzed 124 simulated air samples for asbestos, lead, cadmium, zinc, and solvents with West Allis Memorial Hospital for 12 blood samples and with the Center for Disease Control for 12 blood samples.

The plant studies and visits resulted in more than 5,875 recommendations potentially affecting 286,169 workers.

7(c)(1) ON-SITE CONSULTATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7(c)(1) On-Site Consultation Program sponsored by the U.S. Department of labor, Occupational Safety and Health Administration (OSHA), which provides on-site consultation and in health and safety matters at the employers' requests.

The Division of Occupational Hygiene provides Health Consultants for the solution of industrial hygiene problems in the private sector by the detection, evaluation and control of existing and potential health hazards resulting from occupational exposures.

During Fiscal 1984, 245 requests were received from employers for this free consultation service. Our staff of health consultants completed a total of 287 surveys which included complete and special hazard inspections and evaluations.

The entire consultation staff attended and completed a number of training courses given by the OSHA school in Illinois. These courses are in-depth studies of the several different aspects of industrial hygiene, such as ventilation, noise, and hazardous materials.

The program has a large backlog of requests from all types of industries in Massachusetts.

We have received several letters from employers complementing this voluntary consultative service.

The 7(c)(1) On-Site Consultation Program continues as a desirable program for this Division and for the employers in this Commonwealth. A total of 1,012 environmental analysis and 88 ventilation studies were performed. A total of 405 air samples were collected.

ASBESTOS PROGRAM

The Asbestos Program has been concerned with the disease-causing potential of exposure to airborne asbestos in schools and public buildings. The concern derives from epidemiological evidence linking airborne asbestos by asbestos workers to various types of cancer and non-malignant respiratory diseases. The Division of Occupational Hygiene, Environmental Protection Agency, National Institute for Occupational Safety and Health and the scientific community believe that any level of exposure to asbestos involves some health risk, although the exact degree of risk cannot be reliably estimated.

Children and young adults who are exposed to asbestos have a greater chance than older people of developing certain asbestos-related diseases due to a longer remaining lifespan during which disease may develope. Also smokers exposed to asbestos are at greater risk than non-smokers with similar level of exposure.

It is because of this reason that schools are a number one priority in the Asbestos Program.

ASBESTOS PROGRAM HISTORY

In recognition of the fact that the use of asbestos in public buildings and schools is a potential health hazard, a special legislative commission was established under Chapter 58 of the Resolves of 1975, to investigate and evaluate the extent of asbestos exposure in the public schools and public buildings in Massachusetts.

The mandate for the Asbestos Commission was to "evaluate the extent of the use of asbestos as fireproofing in the public schools and public buildings of the Commonwealth and its containment and removal". The scope of the project was limited to "spray-on" coating under the assumption that it was this type of material which had the greatest potential for generating airborn fibers.

The role of the Asbestos Commission was primarily consulting and administrative. The Asbestos Program was technical in nature and gradually assumed the functions of the Asbestos Commission. Since the Asbestos Program accepted this additional responsibility, it has gathered additional information and valuable experience in assessing the need for corrective action and in controlling the release of fibers from asbestos-containing material.

Although most of the Program's concern is directed toward the 2,000 public schools, it also has the responsibility of assessing approximately 10,000 public buildings. As of this writing, the Asbestos Program has a staff of eight.

The Asbestos Program offers a comprehensive assessment program. This program includes inspection and identification of friable material, bulk and air sampling, exposure assessment and current methods of corrective action.

The Asbestos Program staff analyzed over 3228 bulk samples, 234 air samples, and completed 208 surveys.

Chapter 2 of the Sanitary Code: Minimum Standard of Fitness

The Asbestos Program has completed its project with the Department of Public Health, the Environmental Protection Agency, and the Massachusetts Consumers Council in developing an amendment to the State Sanitary Code. The purpose of this amendment is to minimize exposure to asbestos dust in dwellings. The amendment deals with one common and easily identified source of such dust: Asbestos-containing insulation in pipes, boilers, and furnaces. This amendment became effective in September of 1983.

Chapter 651

Through Chapter 651 of the Acts of 1982, the legislature unfroze 1.38 million dollars in previously appropriated funds for removal or encapsulation of asbestos in public schools with first priority going to those projects determined by the Asbestos Program to be most hazardous. This funding is totally commited with many school systems still seeking economic assistance.

Asbestos Disposal

Asbestos disposal is regulated by the Federal Environmental Protection Agency, the Massachusetts Department of Environmental Quality Engineering, and local boards of health. The Asbestos Program staff has included a provision for safe asbestos disposal at an approved landfill site in its suggested safe practice bulletin dealing with asbestos removal contracts. However, the great amounts of publicity about the dangers of asbestos have made towns reluctant to accept asbestos even at EPA and DEQE approved sites. This has made legal disposal the most difficult part of asbestos abatement.

Senate No. 2154

This bill if passed, would provide grants to reimburse cities, towns, and regional school districts for the removal, encapsulation or containment of asbestos found in public school buildings.

SECOND MCCORMACK BUILDING SURVEY COMPLETED

The Division performed a second temperature profile evaluation of the McCormack Building covering a six week period to determine if any significant differences existed between Summer and Winter conditions. The tests performed in the summer period showed an improved air quality.

No serious basic problems were found with the McCormack ventilation system. It appears, however, that breakdowns occur from time to time. During these periods, complaints from employees are frequent.

ASBESTOS EXPOSURE IN A HIGH RISE OFFICE BUILDING

The Division of Occupational Hygiene investigated an asbestos exposure incident in a high rise office building. The incident occurred when electricians, unaware of the presence of asbestos on I beams and metal deck in the ceiling plenum, removed ceiling tiles to make electrical repairs. By doing this, they contaminated themselves and the office area with asbestos. A complete cleanup of the area was ordered and proper work procedures were instituted.

In order to avoid a repetition of the incident and more adequately protect employees and trades people from a future asbestos exposure risk (insulation material contains 60-80% amosite asbestos throughout the building) a meeting was held with the building management officials. The following recommendations were made:

1. All tenants, employees and trades personnel in this high rise building be notified in writing of the presence of asbestos on girders and metal deck above the ceiling tile.

2. Individuals who are required to remove ceiling tiles and work in the plenum area must be provided with proper respiratory protective clothes. Area also must be isolated.

3. Proper clean-up must be performed after each job.

4. Air monitoring program should be instituted.

5. Records of air sampling results should be kept for inspection.

The building management officials were in complete agreement with the above recommendations and have already started to implement them. The Division will, nevertheless, continue to exercise general surveillance over the asbestos control program.

ETHYLENE OXIDE EXPOSURES IN A DOCUMENT PROCESSING ROOM

The Division investigated exposure to the carcinogen ethylene oxide during the fumigations of historical documents. The fumigation process was performed in a 24 cubic foot chamber exhausted to the outside. Our investigation revealed the door of the chamber was warped and a considerable amount of leakage occurred during the fumigation process. Levels of forty to fifty ppm of ethylene oxide were found which is greatly in excess of the recommended 2 ppm standard. A recommendation was made to halt the use of the fumigator until it was repaired or replaced. Further recommendations were made to increase general ventilation in the room.

BERYLLIUM EXPOSURE IN A DENTAL LABORATORY

The Division was requested to investigate beryllium exposure in a dental laboratory.

Beryllium, because of its strength and durability, was being used as a part of the base metal dental bridges and crowns. The percentage in the alloy was low, approximately 2%, compared with 76% nickel, 13% chromium 5% molybdenum. Beryllium is highly toxic and extreme care must be exercised in handling it. Beryllium in this laboratory is grit blasted and ground and polished to shape it. These operations can be quite dusty if not properly controlled. Local exhaust equipment was available at the location investigated, but a considerable amount of maintenance work was required to bring it up to par.

METHANOL EXPOSURE FROM DUPLICATING MACHINES

The Division investigated exposures to methanol from duplication machines used in a school. The machines were located in the teachers' rooms and general office areas with no local exhaust ventilation. Levels of exposure as high as 2,500 ppm were recorded over a 12 minute operating period. The length of time the machines are used vary considerably, but frequently they are run for periods much longer than 12 minutes. The tests indicate the need for local exhaust ventilation. A recommendation was made to this effect. One machine was located under a fume hood. Methanol levels were very low, around 80 ppm, well below the current standard of 200 ppm.

LEAD EXPOSURE ON A POLICE FIRING RANGE

The Division investigated lead exposure in a police firing range. Lead levels ranged from 0.17 to 1.6 mg/m^3 well above the current OSHA Standard of 0.05 mg/m^3. The policemen are required to practice once a month for a minimum of 2 hours per year. Some of the policemen will shoot for longer periods of time. Even considering the short period of exposure involved, the body burden of lead resulting from the air test values is considered unacceptable.

The range is small and allows only one shooter at one time to fire. No ventilation is provided except for an exhaust duct located behind the shooter. Such an arrangement would tend to pull the lead contaminated smoke towards the shooter before it is removed from the firing range. The ventilation system was very poorly designed. Recommendations were made to completely redesign the system.

SOLVENT EXPOSURE IN A DRY CLEANING SHOP

The Agency investigated solvent and chemical exposure in a clothes cleaning establishment. Excessive levels of stoddard solvent were found in washing areas. Ventilation at the leather dyeing spray booth was found to be poor. Recommendations were made to correct these problems.

HYDROGEN CYANIDE EXPOSURE FROM A GOLD RECOVERY PROCESS

The Agency was notified of a heavy exposure to toxic gases. Upon investigation it was learned that a process involved in the recovery of gold was being performed without local exhaust ventilation. The building occupants were asked to vacate the premises by the fire and police departments who were called to the emergency. By the time our engineer appeared on the scene the cause of the problem was located and the process discounted. Nevertheless tests above the tanks where work was being performed showed levels of 2 ppm. It was recommended that this process be no longer performed under the conditions observed. All processes involving hydrogen cyanide should be performed with adequate local exhaust ventilation. This certainly was not the case at this company. Representatives of the company in question indicated that they would no longer perform this operation. The health department and other local officials were notified of our findings.

ENVIRONMENTAL STUDY OF JOHN W. MC CORMACK STATE OFFICE BUILDING

Complaints received by the Division concerning air quality in the John W. McCormack Building date back to March, 1977. Over twenty individual investigations were made up to September of 1982. Complaints continued to be voiced after this. At this point it was decided that an extensive investigation of the entire building would be performed. The ventilation system was tested and a comprehensive study of climatic conditions during the Spring and Summer of 1983 was performed.

A voluminous report on this study was completed and made available for distribution in January, 1984. It was concluded from this study the design criteria for the ventilation system was met and the system was capable of providing enough air, fresh and recirculated, to meet the normal demands made upon it. Breakdowns in the system, however, were seen to occur from time to time producing discomfort to the occupants.

Relative humidity during the months of January and February was found to be extremely low due to an inoperative humidifying system. Temperature measurements in the Spring and Summer of 1983 were generally satisfactory. On isolated occasions, some rooms were found to be cold, and others were found to be hot. High temperature occurred on some hot summer days because the air conditioning was not turned on early enough.

It was found that room partitions that reach the ceiling caused some areas to be isolated from the ventilation system. These partitions were installed without consideration of the pre-existing ventilation system and inhibit proper distribution of air in some areas.

Discomfort of occupants was found to be increased from exposure to irritants from cigarette smoke.

Except for cigarette smoke, no chemical or biological problems were found over several years covered by this study.

Recommendations for correcting existing problems are found in the report.

EXPOSURE TO A MIXTURE OF ISOCYANATES

Normally exposures to isocyanates used in foam production facilities involve the use of one isocyanate. The Division recently investigated a case where an employee experienced serious pulmonary problem. His physician requested that our agency survey this plant. It was learned that four different isocyanates were used presenting a problem of analysis. This was resolved by using two separate techniques. The analysis were performed by OSHA's Utah Laboratory. The results enabled the Division to locate the high exposure areas and recommend corrective action.

RESPIRATOR COURSE PRESENTED TO BERKSHIRE GAS PERSONNEL

Two days of classes on respiratory protection were presented by the Division's Chief of Engineering Services to service personnel of The Berkshire Gas Company. These individuals visit plants, commercial establishments and private homes to service gas heating equipment. They are subjected to varying degrees of asbestos exposure depending on the condition of asbestos covering of the client's equipment. There were at least 25 attendees per session. An overall view of the potential asbestos exposure problem was discussed. Protective measures including respirator devices and the use of protective clothing were also detailed.

DIVISION STAFF MEMBER MAKES A PRESENTATION AT MASSACHUSETTS SAFETY COUNCIL MEETING

The Division's Chief of Engineering Services discussed health hazards in the work place at the Massachusetts Safety Council Conference. His talk was attended by nearly 50 health professionals.

COBALT EXPOSURE FROM SHARPENING CARBIDE-TIPPED TOOLS

Air samples were taken while carbide-tipped tools were being sharpened. Cobalt levels were found to be in excess of OSHA's standard for a full shift operation. Fortunately the operation is only performed no more than two days per week and for no more than three hours per day. The time weighted average for one overall exposure period was below the current OSHA Standard.

Recommendations were made to improve the exhaust ventilation and limit the grinding to no more than three hours per day.

POTENTIAL ASBESTOS EXPOSURE IN MBTA SUBWAY CARS

An investigation of MBTA subway cars under renovation revealed that seat panels were backed with asbestos. The potential asbestos exposure hazards to MBTA employees, and passengers were evaluated. Bulk analysis confirmed the presence of asbestos. Removal of panels under proper safety procedures was recommended. The removal is currently being done and will require several months to complete. The recommended safety procedure will minimize the asbestos exposure to workers doing this job. No further exposure risk to passengers will occur.

POOR VENTILATION IN AN OFFICE ENVIRONMENT

Employees complained of eye irritation, headaches, fatigue and overall malaise. The investigation revealed that a structure which was formerly a supermarket was converted to office space. No ventilation was provided to center of room. It was found that fresh air dampers were closed and not enough fresh air was being provided. Carbon dioxide tests confirmed the ventilation inadequacy. Recommendations were made to repair fresh air dampers and control the quantity of outside air supplied.

AN UNUSUAL CASE OF PERCHLOROETHYLENE EXPOSURE

The Division received a complaint concerning solvent exposure from employees of a jewelry shop. An investigation of the shop revealed that the chemical in question was perchloroethylene and its source was a dry cleaning plant next door. Perchloroethylene levels in the jewelry shop were as high as 75 ppm (well above standard of 50 ppm). The solvent vapors were entering through the roof top fresh air intake of the jewelry shop which was located within 30 feet of the dry cleaners exhaust. Perchloroethylene readings on roof were as high as 1,300 ppm. A modification in the exhaust system was recommended to correct this situation.

CARBON MONOXIDE EXPOSURE IN A WAREHOUSE

A worker employed in a warehouse complained to the Division that he was experiencing headaches and other symptoms. Carboxyhemoglobin level was found to be elevated. An investigation of his workplace revealed that about nine forklift trucks, mostly propane operated, were being used in an area which was inadequately ventilated. The situation was improved by the installation of more exhaust ventilation.

EMPLOYEE BURNED BY CAUSTIC SODA

An employee of a soap manufacturer suffered chemical burns on one foot from caustic soda. Liquid caustic soda was pumped through a temporary hose line from a storage tank. During this pumping a leak developed and liquid caustic soda sprayed on an employee. Other employees reportedly washed him down promptly with water. Some of the caustic had entered his boot but he did not tell anyone about it. After several days the employee was limping, the other employees found out what had happened, and he was taken to the hospital. The employee was treated and released.

VDT STUDY IS APPROVED

The Massachusetts Legislature voted to grant the Division of Occupational Hygiene $75,000. to conduct a study of video display terminal users throughout the Commonwealth. The study will cover the following areas:

(a) Radiation
(b) Industrial Hygiene
(c) Health complaints, and
(d) Work environment and human factors

The study is not expected to get underway until October or November due to administrative restraints concerning the funds.

RIGHT-TO-KNOW LAW

The Director presented four lectures on the Right-To-Know Law to various industrial oriented groups throughout the state.

These groups represented a fair cross-section of managerial personnel who are entrusted with the responsibility of carrying out the mandates of the new law. The meetings were well attended by groups who were genuinely interested in the subject matter.

NURSING ACTIVITIES

Plant visits were made to occupational health units in Massachusetts industrial plants at the request of nursing or management staff or they were self-initiated contacts made by the occupational health nurse. The number of employees in the various plants visited ranged from 100 to 6,000 at each site. The health units were staffed on site primarily by one full or part-time registered nurse with the consulting physician at an on-site location.

Requests for assistance were primarily to assist new occupational health nurses establish occupational health units. The content of the visit included a meeting with the management staff and the nurse to discuss individual roles and the importance of a team approach. New hsopital-based programs in occupational health also continue to be developed throughout the state.

Other requests from management and health personnel continue to be received relating to mandatory requirements of the state associated with the care of employees injured or who become ill at work including the need for medical directives, confidentiality of medical records and the role of ancillary personnel in occupational health units especially by the role of emergency medical technicians.

Information on legislation relating to Right-To-Know, Employment of Handicapped Persons and Discrimination was also frequently sought by personnel. Referral to the appropriate agency was made as indicated.

It was necessary to temporarily suspend the task force established to develope guidlines or recommendations for the administration of over-the-counter medications to employees in industry.

In the meantime, a questionnaire on the practice has been developed by a member of the task force and has been forwarded to a number of industries.

Meetings and seminars relating to occupational health and safety sponsored by Massachusetts Nursing, Health and Safety Associations were attended to keep updated on issues and trends in the field. Seminars and classes in occupational health were also provided for student nurses.

Arrangements were made for the placement of student nurses in industry as part of their educational program. One meeting was also held with a local college to assist with the developement of a grant to provide an educational program on environmental hazards for occupational health nurses.

Requests were made by the telephone for information relating to many aspects of occupational health. These requests were responded to verbally or by mail as appropriate.

Plans are underway with the Occupational Health Nurses to establish guidlines for Occupational Health Nurses in Massachusetts. This has been determined to be an essential need.

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119	Provisions of the General Laws Relative to Duties of the Department of Labor and Industries in Industrial Health and Safety. November 1936. 1 p.
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95	Occupational Health Hazards in Massachusetts Industries. III. Shoe Manufacture. December 1937. 7 pp.
96	Occupational Health Hazards in Massachusetts Industries. Wood Heel Covering. December 1937. 7 pp.
97	Occupational Health Hazards in Massachusetts Industries. V. Woolen and Worsted Goods Manufacture. February 1938. 4 pp.
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1257	Role of the Occupatioanl Health Physician. May 1979. 1 p.
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1349	Suggested Bid Specifications for Contractual Asbestos Related Work. April, 1983. 6 pp.

SOURCE OF INQUIRY

Source	Services	Information	Total
Employer	86	83	169
Employee	50	16	66
Self-initiated	145	—	145
Follow-up	180	—	180
Division of Industrial Safety	12	—	12
Attorney	2	10	12
Health Professionals (Doctors, dentists, health agents)	26	65	91
Labor unions	34	2	36
Hospital	5	7	12
Public Facilities (Public schools, state and local agencies, etc)	256	53	309
OSHA	—	2	2
Others (Homeowner, students, general public, Representative, university, tenants, Federal Goverment other than OSHA)	9	121	130
Total	915	259	1,164

FIELD WORK

Section	Plant Visits	Other Visits	Meetings	Talk
State Program	687	27	172	5
On-site Consultation Program	280	7	3	3
Asbestos Program	706	31	10	0
Total	1,673	65	185	8

RECOMMENDATIONS MADE

Type		Number	Workers Affected
Environmental		5,367	228,095
Health		508	58,074
	Total	5,875	286,169

RECOMMENDATIONS COMPLETED

Environmental		45	1,047
Health		0	0
	Total	45	1,047

ENVIRONMENTAL TESTS

Substance or condition	Number	In Harmful Exposure Range
Physical Hazards		
Radiation		
(αβγ) Radiation	2,578	64
X-Radiation	1,809	42
Microwaves	379	0
Ultraviolet radiation	20	5
Non-ionizing (VDT)	695	12
Noise	458	115
Illumination	460	48
Humidity	120	12
Temperature	34	1
Chemical Hazards		
Acetic acid	4	0
Acid mist	1	0
Ammonia	33	1
Asbestos	12	1
Carbon Dioxide	577	16
Carbon Monoxide	313	26

ENVIRONMENTAL TESTS
(continued)

Substance or Condition Chemical Hazards (continued)	Number	In Harmful Exposure Range
Chlorine	6	0
Combustible Vapors, N.O.C.	10	1
Ethanol	1	0
Ethyl ether	2	1
Ethylene Oxide	24	4
Formaldehyde	22	0
Hydrocarbons	34	0
Hydrochloric Acid	4	0
Hydrogen Cyanide	12	0
Mercury	130	7
Methane	28	0
Methanol	8	5
Methylene Chloride	1	0
Nitric Acid	7	0
Nitrogen dioxide	3	0
Nitrous fumer	10	4
Nitrous Oxide	43	3
Oil mist	1	0
Oxide of Nitrogen	46	3
Oxygen	1	0
Ozone	20	0

Perchloroethylene	22	9
Petroleum Distillates	4	0
Phosgene	1	0
Styrene	3	0
Sulfer Dioxide	3	0
Sufuric Acid	1	0
Toluene	2	0
1,1,1 Trichloroethane	3	0
Trichloroethylene	8	5
Total	7,953	385

AIR SAMPLES COLLECTED

1. PARTICULATES

Substance	Number	Number in Harmful Range
Asbestos	347	63
Dust	39	3
Oil Mist	2	0
Silica	12	2
Talc	2	2
Wood Dust	5	3
Total	407	73

2. CHEMICALS

Substance	Number	Number in Harmful Range
Acetic Acid	2	0
Acetone	9	0
Acrylobutadiene Styrene	2	0
Acryoline	3	0
Arsine	1	0
Benzene	5	0
Beryllium	2	0
Butyl Acetate	2	0
Butyl Alcohol	9	0
Butyl Cellosolve Acetate	1	0
Cadmium	1	0
Cellulose Acetate	2	1
Chromic Acid	3	0
Chromium	1	0
Coal Tar	1	0
Copper	2	2
Cyclohexanone	12	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
DMSO	2	0
Dimethylaniline	1	0
Epichlorhydrin	2	0
Ethanol	3	3
Ethyl Acetate	5	0
Ethyl Ether	4	0
Ethyleneglycol monoethylether	1	0
Gallium Arsenide	2	0
Hexone	3	0
Hydrocarbon aromatic	3	0
Hydroquione	2	0
Iron	2	0
Isobutyl Acetate	7	0
Isocyanate	1	0
Isopropyl Alcohol	30	1
Lead	37	6
Methanol	32	28
Methylenebispheyl Isocynate (MDI)	8	0
Methyl Cellosolve	1	0
Methyl Cellosolve	4	0
Methyl Chloroform	6	1
Methyl Ethyl Ketone	17	1
Methyl Isobutyl Ketone	2	0
Methyl Methacrylate	1	1

AIR SAMPLES COLLECTED (con't)

Chemical (con't)

Substance	Number	Number in Harmful Range
Methylene Chloride	10	1
Mineral Spirits	5	0
Molybdenum	2	0
Naphtha N.O.C.	12	1
Nickel	2	2
Organic Vapors, N.O.C.	12	0
Pensolve	3	0
Pentoxone	2	0
Perchloroethylene	7	0
Petroleum Distillates	26	0
Petroleum Spirits	1	0
Phenol	6	0
Propane	3	0
Propyl alcohol	4	0
Propyl glycol	3	0
Solvents	2	0
Stoddard Solvent	5	0
Styrene	29	0
Sulfuric Acid	1	0

AIR SAMPLES COLLECTED
2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Tetrachloroethylene	7	3
Tetrahydrofuran	2	0
Tetryl	1	0
Tin	2	0
Toluene	20	0
Toluene Diisocyanate (TDI)	1	1
Trichloroethylene	9	2
Turpentine	3	0
Valvolene	3	0
Wax	2	0
Xylene	26	0
Zinc	1	0
Total	476	50

3. GASES

Formaldehyde	71	4
Freon, N.O.C.	8	0
Ozone	9	3
Total	88	7

LABORATORY WORK

AIR SAMPLES		883
Chemicals	476	
Particulates	407	
MATERIAL SAMPLES		1,249
Chemical	13	
Microscope	1,236	

LABORATORY WORK
(continued)

URINE SAMPLES (con't)		906
Hippuric Acid	18	
Mercury	888	
BLOOD TESTS		5,319
Lead	2,726	
Zinc Protoporphyrin	2,593	
PROFICIENCY ANALYTICAL TESTING PROGRAM		124
Asbestos	16	
Cadmium	16	
Lead	16	
Solvents	36	
Zinc	16	
West Allis Memorial Hospital Blood Testing Program - Lead	12	
Center for Disease Control Blood Lead	12	

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307	Toxic Dusts, Fumes and Gases in Industry. The New England Journal of Medicine, March 18, 1943, 19 pp.

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MASS. MA13.1:985

PREVENTION

DETECTION EVALUATION

CONTROL

Annual Report 1985

THE COMMONWEALTH OF MASSACHUSETTS

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DIVISION OF OCCUPATIONAL HYGIENE
Leonard D. Pagnotto, C.I.H., *Director*

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1985 REPORT OF THE DIVISION OF OCCUPATIONAL HYGIENE

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ANNUAL REPORT

OF THE

DIVISION OF OCCUPATIONAL HYGIENE

FISCAL 1985

This annual report records the program and activities of the Division of Occupational Hygiene, of the Department of Labor and Industries for the fiscal year beginning July 1, 1984.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES".

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education."

PERSONNEL

Leonard D. Pagnotto, M.S., C.I.H., Director
Richard Levine, B.S., Assistant Director
Rose H. Goldman, M.D., Occupational Hygiene Physician
Patricia Circone, B.S., Chief of Laboratory
Rexford G. Alexander, M.S., C.I.H., Chief of Engineering Services
Joel P. Weddig, B.S., C.I.H., Senior Industrial Sanitary Engineer
Frank M. Kramarz, B.S., Senior Industrial Sanitary Engineer
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Virginia M. Summers, R.N., M.S., Supervising Occupational Hygiene Nurse
Janice LaMalva, M.A., Senior Chemist
Erwin Allen, B.S., (CH. Eng.) Senior Chemist
Joseph LaMalva, M.S., Senior Chemist
Robert H. Kenrick, B.S., Senior Chemist
Mark Malchik, M.S., Assistant Industrial Hygiene Engineer
Rodene DeRice, M.S., Assistant Industrial Hygiene Engineer
Patti Pendexter, B.S., Assistant Industrial Hygiene Engineer
Patricia D'Apolito, M.S., Assistant Industrial Hygiene Engineer
Ernest Kelley, M.S., Assistant Industrial Hygiene Engineer
Elise P. Morse, M.S., Assistant Industrial Hygiene Engineer

Kathleen Harvey, M.P.H., Assistant Industrial Hygiene Engineer
Christopher Geiger, M.S., Assistant Industrial Hygiene Engineer
Bonnie Weeks, M.S., Senior Chemist
Michael Kissel, Intern
Bernice Linde, B.S., Administrative Assistant
Sylvia Golub, Principal Clerk
Rea Fulkerson, Senior Clerk Typist
Mary Lim, Senior Library Assistant
Claudia Kelly, Head Clerk

PERSONNEL CHANGES - FISCAL 1985

Ms. Iris Davis joined the Asbestos Program on September 16, 1984 as an Industrial Hygiene Engineer.

Mr. Mark Malchik was promoted on September 16, 1984 from Assistant Industrial Hygiene Engineer in the Asbestos Program to Senior Industrial Sanitary Engineer in the Right-to-Know Program.

Mrs. Sylvia Golub was promoted on September 30, 1984 from Principal Clerk in the Asbestos Program to Head Clerk in the Right-to-Know Program.

Ms. Patti Pendexter transferred on October 1, 1984 from the Asbestos Program to the Right-to-Know Program as an Industrial Hygiene Engineer. Ms. Pendexter transferred from the Right-to-Know Program as an Industrial Hygiene Engineer to replace Ms. Weeks on December 24, 1985.

Ms. Lindsay Kayman joined the Asbestos Program on October 9, 1984 as an Assistant Industrial Hygiene Engineer and resigned on November 3, 1984.

Ms. Rodene DeRice transferred on October 1, 1984 from the Asbestos Program to the Right-to-Know Program as an Assistant Industrial Hygiene Engineer and transferred to the Massachusetts Department of Environmental Quality Engineering on January 26, 1985.

Mr. Gerard Porter joined the Asbestos Program on October 23, 1984 as an Assistant Industrial Hygiene Engineer.

Ms. Kathryn Swanson joined the Asbestos Program as an Assistant Industrial Hygiene Engineer on November 13, 1984.

On December 22, 1984 Ms. Bonnie Weeks resigned from the position as Senior Chemist in the 7-C-1 On-Site Consultation Program.

Ms. Patricia D'Apolito transferred from the Asbestos Program to the Right-to-Know Program on December 24, 1984 and resigned on March 1, 1985.

Ms. Cathleen Donohue joined the Asbestos Program on January 3, 1985 as a Junior Chemist.

On January 31, 1985 Mr. Chris Geiger transferred to the Right-to-Know Program from the Asbestos Program and then transferred to the Right-to-Know Program in the Massachusetts Department of Public Health.

On February 28, 1985 Ms. Nancy McCormack joined the Asbestos Program as an Assistant Industrial Hygiene Engineer.

Mr. Mitchell Campbell joined the Asbestos Program as an Assistant Industrial Hygiene Engineer on March 4, 1985.

Ms. Karla Kelley joined the Right-to-Know Program as an Assistant Industrial Hygiene Engineer on March 11, 1985.

On April 28, 1985 Dr. Rose Goldman resigned from her position as Physician I in the Occupational Hygiene Program and has assumed a role as Medical Consultant.

On June 3, 1985 Mr. Michael Kissel joined the staff full-time as Assistant Chemist.

On June 23, 1985 Thomas Cronin, Philip Korman, Joan Parker, and Nga Tran joined the Right-to-Know Program as Assistant Industrial Hygiene Engineers.

GENERAL ACTIVITIES

The Division of Occupational Hygiene consists of four groups, the regular State Side program, the 7 (C)(1) Consultation Program, and a section of the Right to Know Program and the Asbestos Program.

The Division offices and laboratory are located in rented quarters on the second floor at 1001 Watertown Street, West Newton, MA. Space occupied by the Division at this location expanded from 4,700 square feet to 6,200 square feet in March 1985.

The Division of Occupational Hygiene provides for the solution of industrial hygiene problems in the workplace by detection, evaluation, and control of existing and potential health hazards resulting from occupational exposure.

A total of 2,374 services were provided, including 394 requests for information on matters pertaining to occupational health. These services required a total of 1,912 plant visits, 50 visits to other agencies, and 18 talks and lectures by the Division staff.

Field studies included 6,804 measurements relative to physical hazards, 2,779 measurements relative to environmental and ventilation studies, as well as collection of 10,598 samples and laboratory analysis of same. The laboratory also provided blood lead and Zn PP analysis on 1,882 blood samples submitted to the Division as well as 755 urine mercuries and 15 hippuric acids. The Division also participated in the NIOSH Proficiency Analytical Testing Program which included analysis of simulated known samples for asbestos, lead cadmium, zinc and solvents and in the blood lead testing programs from West Allis Memorial Hospital and the Center for Disease Control. Participation and approval from the latter determines whether the laboratory is OSHA approved for blood lead analysis.

A total of 4,378 recommendations were made by the Division which might potentially affect 258,182 people.

7(C)(1)ON-SITE CONSULATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7 (C)(1) On-Site Consultation Program sponsored by the U. S. Department of Labor, Occupational Safety and Health Administration (OSHA), which provides on-site consultation and health and safety matters at the employers' requests.

During Fiscal 1985, 331 requests were received from employers for this free consultation service. Our staff of health consultants completed a total of 356 surveys which included complete and special hazard inspections and evaluations.

The majority of the consultation staff attended and completed a number of training courses given by the OSHA school in Illinois. These courses are in-depth studies of the several different aspects of industrial hygiene, such as ventilation, noise, and hazardous materials.

The program has a large backlog of requests from all types of industries in Massachusetts.

We have received several letters from employers complementing this voluntary consultative service.

ASBESTOS PROGRAM

The Asbestos Program has been concerned with the disease-causing potential of exposure to airborne asbestos in schools and public buildings. The concern derives from epidemiological evidence linking airborne asbestos by asbestos workers to various types of cancer and non-malignant respiratory diseases. The Division of Occupational Hygiene, Environmental Protection Agency, National Institute for Occupational Safety and Health and the scientific community believe that any level of exposure to asbestos involves some health risk, although the exact degree of risk cannot be reliably estimated.

Children and young adults who are exposed to asbestos have a greater chance than older people of developing certain asbestos-related diseases due to a longer remaining lifespan during which disease may develop. Also smokers exposed to asbestos are at greater risk than non-smokers with similar levels of exposure.

It is because of this reason that schools are a number one priority in the Asbestos Program.

Along with the Attorney General's Office, the DOH co-sponsored a conference at Gardner Auditorium to address issues and distribute protocols concerning the Commonwealth Property Damage Claim. Those in attendance represented every department/agency in the Commonwealth. Representatives from the Massachusetts Municipal Association encouraged cities and towns to participate in this conference. Topics discussed were asbestos litigation, filing a claim in the Johns-Manville Bankruptcy, asbestos in buildings detection and control. The DOH emphasized that its staff would be available to provide technical assistance on any concerns involving asbestos. After 5,000 state buildings were assessed, approximately 13,000 bulk samples were logged in requiring examination. This information documented the presence of asbestos and will be used in the Property Damage Claim.

In January 1985, an interagency task force was established to formulate and coordinate implementation of a comprehensive plan to address the problem of asbestos in buildings owned and occupied by the Commonwealth. Members of the asbestos task force include representatives of state agencies that are involved in asbestos issues from a technical and regulatory perspective. During the last year the task force has undertaken research to learn from the experience of others, explored a number of strategies, and took action to test the usefulness of the various aspects of the comprehensive asbestos plan.

RIGHT TO KNOW PROGRAM SUMMARY - FISCAL YEAR 1985

The Massachusetts Right to Know Law became effective on September 26, 1984, and the Division of Occupational Hygiene Right to Know Program was established shortly thereafter, on October 1, 1984. This report summarizes the initial goals set forth for this program, the activities of this program during FY 1985 (i.e. from 10/1/84 to 6/30/85), and the projected activities for FY 1986.

The initial staffing of this program, as of October 1, 1984, consisted of a technical staff of three, including a Program Manager (Senior Industrial Hygiene Engineer) and two Assistant I. H. Engineers, and a Head Clerk. The goal set forth for the DOH Right to Know (RTK) Program was to act as a technical support group within the Department of Labor and Industries, and as such, carry out activities in the following areas necessary for implementation of the RTK Law:

1. Act as a technical resource for the Division of Industrial Safety to assist in the investigation of alleged violations of the RTK Law.

2. Assist the Commissioner on technical issues involving exemptions or cease and desist orders.

3. Provide technical input into the policy process under RTK by researching relevant technical issues, identifying various policy options, assessing the risks and other considerations associated with the issue, and preparing policy recommendations.

4. Act as technical liaison between DLI and the Departments of Public Health and Environmental Quality Engineering.

5. Assist state and local government and private employers to come into compliance with the RTK Law by providing consultation services.

6. Conduct presentations and educational programs on the RTK Law for management and labor groups.

7. Review Material Safety Data Sheets (MSDSs) submitted by employers, manufacturers, and suppliers for accuracy and completeness.

8. Assist employers to obtain MSDSs from manufacturers and intermediate suppliers under the "diligent effort" concept in the RTK Law.

9. Compile or otherwise obtain MSDSs for employers in circumstances where there is no manufacturer or supplier from which to obtain them.

During the first few months after the RTK Law went into effect (October through January), the major activities of the DOH RTK Program involved the providing of telephone consultation to employers regarding the requirements of the RTK Law. During this time, we responded to approximately 1,500 telephone inquiries per month. In addition, several RTK seminars were presented to various business and labor groups.

During the final months of FY85 (February through June), as the demand for telephone consultation and seminars declined, the major activity of this program consisted of internal program development focusing on the goals outlined above. These activities included the development of protocols for reviewing and compiling MSDSs, developing training programs, formulating technical policy recommendations, and other related tasks. The need for an up-to-date scientific reference library was met by the acquisition of over 100 volumes covering topics such as chemistry, toxicology, industrial hygiene, and occupational health.

A major problem encountered by the DOH Right to Know Program in FY85 was a staff turnover of four assistant engineers between January and April, however, by June 30 the number of assistant engineer positions was increased from two to five, and all positions were filled. An additional position for an EDP operator II will be filled at a later date thereby bringing the Right to Know staff to a total of eight: One Program Manager (Senior Engineer), five Assistant Engineers, one Head Clerk, and one EDP Operator II.

The projected activities of the DOH RTK Program for Fiscal Year 1986 include the following items:

1. The establishment of a RTK Compliance Assistance Program to provide technical consultation services to employers to assist them in meeting the specific requirements of the RTK Law as well as the broad goals--namely, that hazardous chemical situations in the workplace are recognized and the nature of these hazards are effectively communicated to employees.

2. Acquisition of a MSDS database service to use for reviewing the adequacy of MSDSs submitted to DLI by employers and to use as a basis for informing manufacturers when they are not in compliance with the MSDS requirements of the RTK Law. This service will also be used as an information source for compiling MSDSs for employers in situations where there is no manufacturer or supplier from which to obtain one.

3. Respond to letters submitted to this office from employers requesting assistance in obtaining MSDSs under the diligent effort concept. This will be accomplished by informing non-complying manufacturers/suppliers of their obligations in this area, a following up with enforcement activities. To accomplish this, it will be necessary to utilize the newly acquired DOH computer system for tracking purposes.

4. Development of educational materials: The first project will be the preparation of a "MSDS Sourcebook" which will be an in-depth coverage, in lay terms, of all the categories of information found on MSDSs. This book will be useful to employees and employers in helping them read and understand MSDSs.

RADIATION PROGRAM

Meetings of an Ad Hoc Advisory Committee on Nonionizing Radiation were held during the year. The Committee was comprised of radiation experts from industry, organized labor, insurance field, legal profession, M.I.T., and Massachusetts Department of Public Health. The Committee which was chaired by Frank Archibald, DOH, provided invaluable technical assistance in the development of draft rules and regulations relating to nonionizing (electromagnetic) radiation in the frequency range from 10 kilohertz to 100 gigahertz. A public hearing on the proposed Rules and Regulations was held at DOH on June 28, 1985. The hearing was attended by representatives from the broadcast and RF heat sealer industries. Massachusetts is among the first states to develop rules and regulations limiting occupational exposures to nonionizing radiation.

RADIATION CONTROL PROGRAM

Forty three (43) new registrations of companies having sources of ionizing radiation were recorded. These registrations are in addition to the normal processing of additions, deletions, and changes to the registrations of radiation sources among previous or existing registrants. A total of 1,190 companies in the Commonwealth were registerd at the close of FY85.

One hundred and ninety inspections were performed during FY85 to determine compliance with DLI Rules and Regulations pertaining to ionizing radiation. Three hundred and forty-four recommendations evolved from these inspections and were made part of the reports prepared and submitted to Radiation Safety Officer personnel at the inspected companies.

VIDEO DISPLAY TERMINAL (VDT) STUDY

STUDY OF OFFICE WORKERS: HEALTH AND WELL-BEING

The Division of Occupational Hygiene received special funds from the Legislature to conduct a one year study of office workers in Massachusetts to aid them in the examination of proposed regulations pertaining to the use of Video Display Terminals (VDTs) in Massachusetts. Two staff members, the occupational health nurse and one member of the industrial hygiene staff were assigned full-time to conduct the study. An epidemiologist was also employed on a contractual basis to assist the staff in the development, implementation, and analysis of the study. Six other personnel were also employed on a contractual basis to assist with the data collection and data entry.

The stated objective of the study was to assess the effects, if any, of VDT use associated with office work and the occurrence of musculoskeletal conditions, visual conditions, headaches, colds and sore throats and level of stress among VDT operators.

The study was conducted in three phases. Phase I included the administration of a questionnaire to a representative sample of 2,000 office workers employed by industries and businesses in Massachusetts.

The sample was randomly selected from six industry groups expected to have a prevalence of VDT use among their clerical workers. Clerical workers who did not perform VDT tasks were included in the study as a control group.

Thirty-eight (38) work sites in the following industry groups were surveyed: Banking, Hospitals, Communications, Data Processing and Computer Services, Insurance, Public Utilities, and several of the State Departments. The questionnaire was well received by office workers who were approached to participate in the study. However, not all industries included in the sample agreed to participate.

Participating companies and workers were assured that confidentiality of the participants would always be maintained.

While the questionnaire was being completed at the work site, basis air quality measurements were made. These included temperature and humidity readings and carbon dioxide levels.

Phase II of the study was conducted with VDT operators only. Specifically, the aim was to evaluate the workstations of those who experienced the most and least visual musculoskeletal and headache symptoms. The health questionnaire was readministered as a quality control check and ergonomic data associated with workstations was collected. This data included measurements of chair and table heights, viewing angles, lighting factors, and other ergonomic factors.

Measurements were also taken to determine the presence of either ionizing and/or non-ionizing radiation. A representative number and makes of terminals were measured at three locations.

Phase III of the study included an offering of educational seminars to participating companies. The seminars were conducted by the Office Technology Project staff who were also under contract to the Division of Occupational Hygiene to provide this service. Curriculum materials were developed and free seminars were provided mostly to educators, managers, and supervisors who are responsible for clerical employees and who may also select and purchase office equipment.

At the end of the year, data collection for Phase I and II had been completed and some analysis of the data had begun. Completion of data analysis and preparation of the final report and presentation of the educational seminars remain to be accomplished.

APARTMENT TENANTS COMPLAIN ABOUT HEAVY PERCHLOROETHYLENE EXPOSURE

The owner of a dry cleaning store located on the ground floor of an apartment building was in the process of recycling perchloroethylene when the distilling unit of his dry cleaning equipment malfunctioned. Over 80 gallons of the solvent were spilled on the floor of the store. The owner and his assistant were overcome, but rescued when alert tenants in the building called the fire department. The entire building was vacated for several days until all of the perchloroethylene was recovered and the air was free of the solvent. The investigation and tests were performed by our Agency. A recommendation was made that this type of operation should not be allowed in an apartment building. The health authorities of the city agreed.

HEALTH HAZARDS IN A REGIONAL HIGH SCHOOL

Several complaints were received from the staff of a regional high school which might create potential health hazards. Several overexposures were detected. Among these were a high exposure to methyl methacrylate used in the dental laboratory. To control this, local exhaust ventilation was installed.

Carbon monoxide levels of 220 ppm were detected in the Auto Technology Department. This level was attributed to lack of general fresh air and the poor condition of exhaust hoses. Repairing hoses and an increase in the fresh air supply were recommended.

Elevated lead exposures detected in the Autobody Department were produced from gunking and overexposures of lead were caused by soldering operations in the Plumbing Department and from smelting scrap in the Graphics Department. Control measures were specified for each of these operations.

Excessive ammonia concentrations were found in the Drafting and Design Department from residual on blueprints. A special local exhaust system was recommended.

TOWN HALL REGISTERED BAD AIR COMPLAINT

The quality of air in the office of a town hall was tested. A motor vehicle garage was located on the basement level of the building. Auto exhaust fumes were reaching the office through damaged ceiling and doorways. To solve this problem work practices in the garage were modified. It was also found that the fresh air supply of the office and garage were inadequate. Because of energy conservation measures, the fresh air supply had been reduced below the 15 percent recommended by this Division.

AIR QUALITY IN A SCHOOL ENVIRONMENT

A recent air quality survey in a junior high school revealed the fresh air quality to be 11 percent which is below the recommendation of this Agency. Recommendations were made to increase the total air supply as well as the fresh air supply.

SODIUM HYDROSULFITE FIRE

A manufacturing firm was using sodium hydrosulfite as a reducing agent in its wastewater treatment area. The chemical was accidentally exposed to moisture and a strong exothermic reaction occurred. Smoke from the reaction spread to the ventilation system causing the building to be vacated. The fire department was able to quench the burning material with an excessive amount of water. Our Agency investigated the accidental occurrence to determine if the facility was safe to re-enter. Air tests were made for sulfur dioxide and found to be non-detectable. Recommendations were made for future safe handling of hydrosulfite.

LEAD EXPOSURE IN A SALVAGE SHOP

Our Agency was called upon to investigate lead exposure in a wire reclamation shop. In the process telephone cable wire was cut in six foot sections on a shearing machine, and the insulation was stripped off. Copper and lead from the wire is sent to a smelting plant for reclamation. Heavy exposures were encountered during the shearing and desheathing operations. No ventilation controls were present. Recommendations were made to install (1) a ventilation system (2) sprinkling system to wet the cutting operation.

The two installations when completed are expected to adequately control the lead exposure.

ETHYLENE OXIDE FUMIGATION

Our Agency was requested to evaluate exposure to ethylene oxide used to fumigate documents in a university library. The fumigation was performed using a "Vacufume-18" archive fumigator.

The gas used was a mixture of 12 percent ethylene oxide and 88 percent freon. Leakage was detected near the door.

Certain work practices were also observed that exposed workers unnecessarily to ethylene oxide and freon. By altering work practices and changing door gaskets, exposure levels were reduced to acceptable concentrations.

NOISE HAZARD FROM BRICK MANUFACTURING

A request was made for a dust and noise survey of a brick manufacturing factory. Dust levels were found to be satisfactory, but the noise levels generated by the molding process were excessive. Readings as high as 98 decibels were recorded. Air pressure and machinery were the sources of the noise. The noise problem did not lend itself to any simple solution.

Although the process was automated, the equipment and procedures used are not modern. A complete redesign of the production methods would be required to reduce noise levels to acceptable levels. Strict adherence to a hearing conservation program using ear protection devices was recommended.

AIR QUALITY IN A MUSICAL CENTER

The Division investigated health problems experienced by musicians in the center orchestra pit. General fatigue, respiratory tightness, dehydration and excessive dusts were among the complaints which were elicited.

The principal problem was an inadequate supply of air in the pit. The ventilation dampers were opened to alleviate this condition and appeared to solve the problems.

Better housekeeping to reduce dust exposure and an increase in humidity were also recommended to improve the work environment for the musicians.

FORKLIFT TRUCK WAS SOURCE OF CARBON MONOXIDE EXPOSURE

Two workers reported symptoms of dizziness and lightheadedness while employed in the chemical mixing area of a plant which formulated commerical cleaning products. The source of the problem was not in the mixing process. An inspection of the area revealed that a gasoline powered forklift truck was frequently utilized in the chemical mixing area. Carbon monoxide levels in excess of 300 ppm were found. A recommendation was made to tune-up the forklift which resulted in some reduction of the carbon monoxide, but not enough to meet the existing environmental standard of 35 ppm. The final solution to the problem was to install a PTX purifier on the forklift truck exhaust. A remarkable reduction to 5 ppm was achieved. Other trucks at the plant will also be fitted with PTX purifiers in the near future.

LEAD EXPOSURE HAZARD ON A BALLISTIC RANGE

Firing ranges continue to be a source of high lead exposure. The Division investigated conditions at a state facility and found levels that markedly exceeded the current lead standard (0.05 mg/m^3). Control measures recommended included local exhaust ventilation. It was emphasized that, if used properly, a good ventilation design will satisfactorily control lead contamination in firing ranges. In addition to engineering control, good housekeeping practices should be employed.

HEAVY LEAD EXPOSURE SHEARING LEAD CABLE

Workers involved in cutting lead cable were found to experience an excessive exposure to lead. Levels were in excess of twofold above the permissible exposure level (0.05 mg/M^3). Engineering controls were recommended including local exhaust ventilation and a fogging unit to control dust dispersion in the work area.

HYDROGEN SULFIDE EXPOSURE INCIDENT

The Division was notified that workers from a wastewater treatment plant complained of a strong distasteful chemical odor. In addition to the odor, copper piping throughout the facility was noted to have turned black. An extensive investigation of the facility revealed that the source of the problem was in the head works area which receives sewage from the town system. This area is located in a sub-basement of the main plant that also houses business offices and laboratories. It was determined that anaerobic oxidation of sewage produced hydrogen sulfide. The gas was largely confined to the head works where no one is usually employed. One day, however, repairs were being made in the head works and the wet scrubbers were turned on. The capacity of the wet scrubbers to neutralize hydrogen sulfide was overwhelmed and gas escaped through the exhaust which was located near the front door of the building. The hydrogen sulfide gas then found its way into the general ventilation of the building causing the contamination problem which was reported. The building was evacuated. The source of the overexposure was found to be in the grit chamber. Following draining and pumping of the area, the level subsided. An alarm system was installed in the area and a second alarm was installed in the office to serve as a warning in the event of future problems.

HYDROGEN SULFIDE EXPOSURE IN A SECOND WASTEWATER TREATMENT PLANT

Upon completion of our study of hydrogen sulfide exposure in an eastern Massachusetts wastewater treatment plant, a similar problem was reported in central Massachusetts. The similarity betwen the two incidents was noteworthy. The solution of the problem was to provide more frequent cleaning of the sludge holding tanks which were located within the building also.

MISCELLANEOUS BULLETINS

Bulletin No.	
7	Mass. Chapter 44, Resolves of 1934, Protection of Workers. Granite and Foundry Industries. May 1934. 1p.
25	Mass. Benzol Labeling Law, May 1937. 2 pp.
119	Provisions of the General Laws Relative to Duties of the Department of Labor and Industries in Industrial Health and Safety. November, 1936. 1 p.
78	Use of Phenol and Cresol in Cutting Oils. October 1937. 1 p.
93	Occupational Health Hazards in Massachusetts Industries. I. Lead Storage Battery Manufacture. December 1937. 7 pp.
94	Occupational Health Hazards in Massachusetts Industries. II. Paint and Varnish Manufacture. January 1938. 10 pp.
95	Occupational Health Hazards in Massachusetts Industries. III. Shoe Manufacture. December 1937. 7 pp.
96	Occupational Health Hazards in Massachusetts Industries. IV. Wood Heel Covering. December 1937. 7 pp.
97	Occupational Health Hazards in Massachusetts Industries. V. Woolen and Worsted Goods Manufacture. February 1938. 4 pp.
116	Skin Burns From Lime Dust. September 1938. 1 p.
121	Granite Dust Control. I. Banker Exhaust Ventilation. Supplement. A. The Ruemelin Banker Exhaust Unit. May 1957. 1 p.
122	Granite Dust Control. I. Banker Exhaust Ventilation. Supplement B. The C.F. Berg Banker Exhaust Unit. November 1938. 1 p.
125	Suggested Maximum Allowable Concentration (Fumes) and Comments. November 1938. 1 p.
127	Occupational Health Hazards in Massachusetts Industries. VI. Fur Cleaning. November 1938. 6 pp.
130	Granite Dust Control. II. Surfacer Exhaust Ventilation. Supplement A. The Encircling Hood and Baffle Disc. November 1938. 1 p.
149	An Act Establishing A Division of Occupational Hygiene in the Department of Labor and Industries and Defining Its Powers and Duties. Chapter 331. Acts of 1934. March 1939. 1 p.
150	Provisions of the General Laws Relative to the Health of Industrial and Mercantile workers. March 1939. 1 p.

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169 Ventilation Degreasing Tank. January 1981. 1 p.
170 Provisions of the General Laws Relative to Duties of the Department of Labor and Industries in Industrial Health and Safety. General Laws. Chapter 23 and 149. November 1938. 1 p.
188 Control of Methanol in Wood Heel Industry. July 1940. 2 pp.
210 Health Hazards in Metal Spraying. March 1953. 1 p.
230 Health Hazards from Paint Removers. July 1976. 1 p.
287 Industrial Operations Involving Potential Lead Hazard. December 1942. 1 p.
290 Safe Health Practices Relating to the Use and Handling of Radioactive Luminous Paints. December 1942. 8 pp.
437 Granite Dust Control. I. Banker Ventilation. March 1948. 2 pp.

499 Recommended Precautions to be Observed in the Breaking Up and Disposal of Fluorescent Lamps. April 1949. 1 p.
617 Standard Hoods for Grinding, Buffing, and Polishing. March 1952. 2 pp.
681 Granite Dust Control. II. Surfacer Exhaust Ventilation. August ,1955. 2 pp.
728 Versenate Toxicity in Man. April 1958. 1 p.
763 Conference on Parathion and Other Organic Phosphate Insecticides. October 1959. 4 pp.
790 Maximum Allowable Concentrations Recommended for Mineral and Inert Dusts. November 1960. 2 pp.
844 Instructions for Collecting Urine Samples for Lead Analysis. February 1967. 3 pp.
865 Procedure for Collection of Timed Urine Samples. June 1964. 1p.
866 Study of Timed Urine Samples. June 1964. 2 pp.
908 The Safe Operation of Vapor Degreasers. February 1967. 3 pp.
912 Interpretation of Urinalysis Results for Lead and Coproporphyrin. June 1967. 1 p.
917 Storage of Arsenite in Aluminum Tank Leads to Arsine Poisoning. October 1967. 1 p.
921 Ventilation Requirements for Control of Fumes from Electrical Arc Welding and Cutting. January 1968. 4 pp.
933 Substitutes for Carbon Tetrachloride. June 1968. 2 pp.
948 Asbestos Survey. April 1969. 3 pp.
949 Progress Report. Survey of Water Tank Painting. April 1969. 5 pp.
968 Control of Carbon Monoxide Gas in Automobile Garages. January , 1970. 3 pp.
971 Manhole Accidents. September 24, 1969. 1 p.
972 Health Hazards in the Metal Can Industry. February 1968. 3 pp.
984 Industrial Vacuum Cleaning. May 1970. 2 pp.

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987 Inert Gas-Shielded Arc Welding. June 1970. 2 pp.
1009 Benzene Exposure of Furniture Strippers. July 1971. 3 pp.
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Bull. No.	Data Sheet No.	Title
		Accident Prevention
1169	1	Welding Explosions
		Chemical Data Sheets
1233	1	Formaldehyde
1234	2	Carbon Tetrachloride
1144	3	Benzene
1236	4	Carbon Disulfide
1329	5	Chromates
1342	6	Carbon Monoxide
1328	7	Trichloroethylene
1317	8	Ammonia
1326	9	Mercury
1279	10	Hydrogen Sulfide
1354	11	Fluorides
1149	12	Cadmium
1073	13	Methanol
1361	14	Lead
1180	15	Methyl Ethyl Ketone
1048	17	Acetone
1302	20	Oxides of Nitrogen
1292	21	Petroleum Naphtha
1309	22	Zinc
1323	23	Sulfur Dioxide
1129	24	Cyanides
1251	25	Organic Acetates
1370	26	Toluene
1363	27	Perchloroethylene
1182	28	Beryllium
1074	29	Methyl Chloroform
1255	30	Uranium
1043	31	Butyl Alcohol (N-Butanol)
1369	32	Parathion
1316	33	Isocyanates
1185	34	Epoxy Resins
1366	35	Ozone
1261	36	Chlorine
1262	37	Styrene
1263	38	Aniline
1282	39	Xylene
1285	40	Inorganic Arsenic
1301	41	Tetrachloroethane
1303	42	Dioxane
1367	43	Ethylene Oxide

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Medical Data Sheets
1371	1	Anthrax
1350	2	Brucellosis
1027	3	Leptospirosis-Weils's Disease
1357	4	Erysipeloid
1372	5	Ornithosis (Psittacosis, Parrot Fever)
982	6	Gas Gangrene
1049	7	Tetanus - "Lockjaw"
1151	8	Poison Ivy Dermatitis
1224	9	Cutting Oil Dermatitis
1244	10	Personal Hygiene in Handling Epoxy Resins
		Mineral Data Sheets
1222	1	Silica
1352	2	Asbestos
1290	3	Mica
1321	4	Pumice
1324	5	Talc
1322	6	Granite
1304	7	Silicon Carbide
1320	8	Aluminum Oxide
1327	9	Fibrous Glass
		Physical Data Sheets
1260	1	X-Rays
1294	2	Ultraviolet Radiation
1277	3	Infrared Radiation
1138	5	Noise
1207	6	Excessive Heat
1276	7	Increased Pressure
1075	9	Dampness
1269	12	Cobalt-60
1306	13	Strontium-90
1288	14	Tritium
1264	15	Krypton-85
1273	16	Iridium-192
1281	17	Thorium
1297	18	Radium
1275	19	Leak Testing of Sealed Radioactive Sources
1284	20	Microwaves

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Respiratory Protection Data Sheets
1189	1	Self-Contained Breathing Masks
1223	2	Acid Gas Masks
998	3	Organic Vapor Masks
999	4	Acid Gases and Organic Vapors
942	5	Ammonia Gas Masks
1198	6	Carbon Monoxide Gas Masks
945	7	Universal Gas Masks
958	8	Hose Masks--Type A
959	9	Hose Masks--Type B
969	10	Air-Line Respirators
960	11	Blasting Helmets
936	13	Dispersoid Respirators Toxic Dusts
1157	17	Chemical Cartridge Respirators--Organic Vapors
1176	18	Chemical Cartridge Respirators--Acid Gases
1177	19	Chemical Cartridge Respirators--Acid Gases and Organic Vapors
1173	20	Chemical Cartridge Respirators--Ammonia
997	21	Chemical Cartridge Respirators--Mercury Vapor
1206	22	Massachusetts Sales Representatives of Manufacturers of Respiratory Protective Equipment
947	23	Chemical Cartridge Respirators--Dispersoids and Organic Vapors
1230	24	Dispersoid Respirators--Highly Toxic Dusts
1215	25	Respiratory Protective Devices
1178	26	Chemical Cartridge Respirators--Pesticides
1188	27	Chemical Cartridge Respirators--Paints, Lacquers, Enamels
1211	28	Dispersoid Respirators--Asbestos
1213	29	Dispersoid Respirators--Dusts, Fumes, Mists and Fibers
1214	30	Dispersoid Respirators--Pneumoconiosis and Fibrosis Producing Dusts and Mists
1248	31	Respirators Care and Maintenance Program

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Ventilation Data Sheets
1122	1	Planers
1094	2	Plating Tanks
1147	3	Spray Booths
1012	4	Portable Grinders
1259	5	Open Tanks
1107	6	Swing Frame Grinders
1209	7	Blasting Rooms
1315	8	Granite Blasting Rooms
1102	9	Tumblers--Hollow Trunnion Type
1053	10	Foundry Shakeout
1174	11	Weather Caps
1041	12	Soldering Bench
1196	13	Disc Grinder--Horizontal Single Spindle Type
1028	14	Disc Grinder--Vertical Spindle Type
1039	15	Grinding and Polishing Belt
1353	16	Portable Bench Grinder
1104	17	Bucket Elevator
1096	18	Melting Furnace, "Tilting"
1197	19	Pouring Station
1072	20	Make-Up Air
1258	21	Laboratory Hood
1318	22	Spray Painting Rooms
		Nursing Data Sheets
1117	1	Plant Shuttle Service
1358	2	Information Concerning Pregnant Employees
1346	3	Eye Safety Program
1356	4	Epilepsy
1293	5	Emergency Medical Transportation
1355	6	Recommended First Aid Supplies
1241	7	First Aid Log
1202	8	Hearing Conservation
1145	9	Heimlich Method of Resuscitation
1154	10	Occupation/Work History
1246	11	Color Coding
1345	12	Massachusetts Poison Control System
1365	13	Services Available for Health and Educational Material
1205	14	Guidelines for Informing Employees of Medical and/or Laboratory Findings
1226	15	First Aid Monthly Summary

SOURCE OF INQUIRY

Source	Services	Information	Total
Employer	139	127	266
Employee	135	93	228
Self-inititated	213	0	213
Follow-up	105	0	105
Division of Industrial Safety	28	0	28
Attorney	2	4	6
Health Professionals (Doctors, dentists, health agents)	65	17	82
Labor unions	43	13	56
Hospital	9	4	13
Public Facilities (Public schools, state and local agencies, etc)	275	56	331
OSHA			
Others (Homeowner, students, general public, Representative, university, tenants, Federal Government other than OSHA)	29	80	109
Total	1043	394	1437

FIELD WORK

Section	Plant Visits	Other Visits	Meetings	Talks
State Program	598	38	256	6
On-Site Consultation Program	356	0	24	1
Asbestos Program	1023	12	52	11
Total	1912	50	332	18

ENVIRONMENT TESTS

Substance or Condition	Number	In Harmful Exposure Range
Physical Hazards		
Radiation		
$(\alpha\beta\gamma)$ Radiation	2281	57
X-Radiation	1764	40
Microwaves	70	2
Ionizing Radiation	232	0
Non Ionizing Radiation	985	-
Total	5332	99
Noise	770	309
Illumination	603	89
Humidity	82	15
Temperature	17	1
Total	6804	414
Chemical Hazards		
Acetic acid	1	-
Acetone	2	-
Ammonia	31	2
Carbon Dioxide	1128	522
Carbon Monoxide	330	98
Chlorine	5	1
Combustible Gas	10	0
Ethyl Alcohol	1	0
Ethylene Oxide	327	250
Formaldehyde	10	2
Hydrocarbons	13	0
Hydrochloric Acid	10	0

ENVIRONMENT TESTS

(continued)

Substance or Condition	Number	In Harmful Exposure Range
Chemical Hazards (continued)		
Hydrocyanic Acid	2	0
Hydrofluoric Acid	1	0
Hydrogen Sulfide	89	35
Isocyanates	8	4
Mercaptans	2	0
Mercury	127	31
Methyl Bromide	2	0
Methyl Chloroform	2	1
Nitrogen Dioxide	1	0
Nitrous Fumes	46	0
Nitrous Oxide	100	24
Oil Mist	1	0
Oxygen	1	0
Oxides of Nitrogen	4	0
Ozone	7	1
Perchloroethylene	26	4
Petroleum Distillates	2	0
Phenol	3	0
Phosgene	1	0
Sulfur Dioxide	12	0
Toluene	8	1
Trichloroethylene	3	1
Ventilation	462	139
Total	2779	1116

AIR SAMPLES COLLECTED

1. PARTICULATES

Substance	Number	Number in Harmful Range
Asbestos	226	26
Dust	59	9
Oil Mist	3	0
Silica	12	8
Talc	7	4
Wood Dust	3	0
Total	310	47

2. CHEMICALS

Substance	Number	Number in Harmful Range
Acetic Acid	8	0
Acetic Chromates	1	1
Acetone	21	3
Aluminum Oxide	4	0
Amines	1	0
Ammonia	15	0
Amyl Acetate	1	0
Butyl Acetate	14	3
Butyl Alcohol	4	0
Butyl Cellosolve	2	0
Butyl Cellosolve Acetate	4	0
Cadmium	11	0
Carbon Black	1	0
Cellosolve	1	0
Cellosolve Acetate	6	0
Chloroform	1	0
Chrome	6	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Chromic Acid	1	0
Chromium	12	2
Cobalt	13	5
Copper	4	1
Creosote	6	0
Cyclohexanone	16	1
Diisobutyl Ketone	1	0
Dipropylene glycol monoethyl ether	4	0
Epichlorhydrin	3	0
Ethanol	1	0
2 Ethoxy ethyl Acetate	1	0
Ethyl Acetate	7	0
Ethyl Alcohol	13	0
Ethyl Methacrylate	2	0
Ethylene Dichloride	1	0
Ethylene Glycol	1	0
Ethylene Oxide	71	48
Fluorine	4	0
Gasoline	2	0
Gas Chromatograph Scan	2	0
Hexane	6	1
Hydrofluoric Acid	2	0
Hydroquinone	1	0
Hydrogen Sulfide	12	2
Isopropyl Alcohol	15	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Iron	3	0
Iron Oxide	7	0
Isocyanate	2	0
Isopropyl Alcohol	18	0
Lead	72	37
Magnesium	1	1
Manganese	4	0
Mercaptans	2	2
Methacrylate	7	0
Methanol	20	7
Methyl Alcohol	2	0
Methyl Ethyl Ketone	29	3
Methyl Methacrylate	3	1
Methylene Bisphenyl Isocyanate (MDI)	11	0
Methylene Chloride	41	1
Methyl Isobutyl Ketone	10	0
Mineral Spirits	1	0
Molybdenum	4	0
Naphtha	3	0
Nickel	28	0
Nitric Acid	2	0
Perchloroethylene	9	0
Petroleum Distillates	59	1
Phenol	6	0

AIR SAMPLES COLLECTED

2. CHEMICALS (continued)

Substance	Number	Number in Harmful Range
Phosphoric Acid	4	1
Phosphorus	5	0
Propanol	1	0
Propylene Glycol	2	0
Propyl Glycol Methyl Ether	8	0
Selenium	2	0
Silver	2	0
Sodium Hydroxide	2	1
Styrene	11	3
Sulfur Dioxide	1	0
Sulfuric Acid	6	1
Terpenes	3	1
Tetrahydrofuran	5	3
Tin	8	0
Toluene	68	3
Toluene Diisocyanate (TDI)	8	0
Trichlorobenzene	1	0
III Trichloroethane	45	0
Trichloroethylene	9	1
Ultra Violet Scan	6	0
Xylene	49	1
Zinc	16	4
Total	929	140

3. GASES

Formaldehyde	42	4

AIR SAMPLES COLLECTED

3. GASES (continued)

Substance	Number	Number in Harmful Range
Freon	14	0
Ozone	19	2
Total	75	6

LABORATORY WORK

AIR SAMPLES

Chemical	1014	
Particulates	310	
Total		1324

MATERIAL SAMPLES

Bulk Asbestos	9274	
Total		9274

URINE SAMPLES

Hippuric Acid	15	
Mercury	755	
Total		770

BLOOD TEST

Lead	1882	
Zinc Protoporphyrin	1882	
Total		3764

PROFICIENCY ANALYTICAL TESTING PROGRAM

Asbestos	16
Cadmium	16
Lead	16
Solvents	48
Zinc	16
West Allis Memorial Hospital Blood Testing Program - Lead	12
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MASS. MA13-1:986

PREVENTION

DETECTION EVALUATION

CONTROL

Annual Report 1986

THE COMMONWEALTH OF MASSACHUSETTS

GOVERNMENT DOCUMENTS
COLLECTION

NOV 13 1987

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DEPARTMENT OF LABOR AND INDUSTRIES
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DIVISION OF OCCUPATIONAL HYGIENE
Richard Levine, *Director*

Originating Office

Department of Labor and Industries, Division of Occupational Hygiene

1001 Watertown Street, West Newton, Massachusetts 02165

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ANNUAL REPORT OF THE

DIVISION OF OCCUPATIONAL HYGIENE

FISCAL 1986

This annual report records the programs and activities of the Division of Occupational Hygiene, of the Department of Labor and Industries for the fiscal year beginning July 1, 1985.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter Three Hundred Thirty-one of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES".

Section Eleven A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education."

PERSONNEL

Leonard D. Pagnotto, M.S., C.I.H., Director
Richard Levine, B.S., Assistant Director
Rose H. Goldman, M.D., Occupational Hygiene Physician
Patricia Circone, B.S., Chief of Laboratory
Rexford G. Alexander, M.S., C.I.H., Chief of Engineering Services
Joel P. Weddig, B.S., C.I.H., Senior Industrial Sanitary Engineer
Frank M. Kramarz, B.S., Senior Industrial Sanitary Engineer
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Virginia M. Summers, R.N., M.S., Supervising Occupational Hygiene Nurse
Janice LaMalva, M.A., Senior Chemist
Erwin Allen, B.S., Senior Chemist
Joseph LaMalva, M.S., Senior Chemist
Patti Pendexter, B.S., Senior Chemist
Cathleen Donohue, B.S., Junior Chemist
Mark Malchik, M.S., Senior Industrial Hygiene Engineer
Karla Kelley, B.S., Assistant Industrial Hygiene Engineer
Joan Parker, M.S., Assistant Industrial Hygiene Engineer
Thomas Cronin, M.S., Assistant Industrial Hygiene Engineer
Philip Korman, M.P.H., Assistant Industrial Hygiene Engineer
Nga Tran, M.S., Assistant Industrial Hygiene Engineer
Ernest Kelley, M.S., Assistant Industrial Hygiene Engineer
Nancy McCormack, B.S., Assistant Industrial Hygiene Engineer
Kathleen Harvey, M.P.H., Assistant Industrial Hygiene Engineer

Kathryn Swanson, B.S., Assistant Industrial Hygiene Engineer
Iris Davis, M.P.H., Assistant Industrial Hygiene Engineer
Gerard Porter, B.S., Assistant Industrial Hygiene Engineer
Mitchell Campbell, B.S., Assistant Industrial Hygiene Engineer
Michael Kissel, B.S., Assistant Chemist
Robert H. Kenrick, B.S., Senior Chemist
Elise P. Morse, M.S., Assistant Industrial Hygiene Engineer
Bernice Linde, B.S., Administrative Assistant
Claudia Kelly, Head Clerk
Rea Fulkerson, Senior Clerk Typist
Sylvia Golub, Head Clerk
Mary Lim, Senior Library Assistant

PERSONNEL CHANGES - FISCAL 1986

On August 24, 1985, Ms. Cheryl Johnston joined the staff as an EDP Entry Operator II in the Right to Know Section.

Mr. Leonard D. Pagnotto, Director of the Division, retired on September 28, 1986.

Mr. Richard Levine was appointed Acting Director on October 6, 1985.

Ms. Iris Davis resigned from her position of Assistant Industrial Hygiene Engineer in the Asbestos Program to take a position with the Department of Environmental Quality Engineering on October 19, 1985.

Mr. Rexford Alexander retired as Chief of Engineering Services in the 7-C-1 On-Site Consultation Program on October 26, 1985.

Mr. Leonard D. Pagnotto rejoined the staff on a part-time basis on November 5, 1985 as an Associate Sanitary Engineer.

On November 11, 1985, Ms. Kathleen Harvey transferred from the Asbestos Program to the 7-C-1 Consultation Program as a Senior Chemist.

Ms. Cathleen Donohue was promoted on December 15, 1985 to an Assistant Industrial Hygiene Engineer in the Asbestos Program.

Mr. Rexford Alexander rejoined the staff on December 15, 1985 as a Senior Industrial Hygiene Engineer on a part-time basis.

Ms. Claudia Kelly retired from the Division as a Head Clerk on December 28, 1985.

Ms. Kathleen Estridge, M.S. joined the Asbestos Program on December 29, 1985 as an Assistant Industrial Hygiene Engineer.

Ms. Sylvia Golub transferred laterally from the RTK Program to the State Side Program on the first week of January 1986.

Mr. Erwin Allen was promoted from a Senior Chemist to Chief of Engineering Services in the 7-C-1 On-site Consultation Program on January 5, 1986.

Ms. Kathryn Swanson transferred from the Asbestos Program to the 7-C-1 On-Site Consultation Program as an Assistant Industrial Hygiene Engineer on January 26, 1986.

Ms. Julie Jones joined the Asbestos Program as an Assistant Industrial Hygiene Engineer on January 26, 1986.

In February of 1986 Ms. Mary Lim was promoted from Senior Library Assistant to the RTK Head Clerk.

Effective February 2, 1986 Ms. Elise Morse was promoted from Assistant Industrial Hygiene Engineer to Senior Chemist in the State Side Program.

Mr. Richard Levine was sworn in by Governor Michael Dukakis as the Director of the Division of Occupational Hygiene on February 12, 1986.

In March of 1986 Ms. Cheryl Johnston was promoted from EDP Entry Operator II to Senior Library Assistant and Ms. Rea Fulkerson was promoted from Senior Clerk Typist to EDP Entry Operator II.

GENERAL ACTIVITIES

The Division of Occupational Hygiene consists of four sections, the regular State Side Program, the Asbestos Program, and the engineering sections of the 7(C)1 Consultation Program and Right to Know Program.

The Division offices and laboratory are located in rented quarters on the second floor at 1001 Watertown Street, West Newton, MA. Sixty-two hundred (6,200) square feet of space is occupied by the Division at this location.

The Division of Occupational Hygiene provides for the solution of industrial hygiene problems in the workplace by detection, evaluation, and control of existing and potential health hazards resulting from occupational exposure.

A total of 2,755 services were provided, including 991 requests for information on matters pertaining to occupational health. These services required a total of 1,764 plant visits, 427 meetings and 111 talks and lectures by the Division staff.

Field studies included 5,713 measurements by direct reading methods as well as collection of 4,560 samples and laboratory analysis of same. The laboratory also provided blood lead and zinc protoporphyrin analysis on 2,232 blood samples submitted to the Division as well as 917 urine mercuries. The Division also participated in the NIOSH Proficiency Analytical Testing Program which included analysis of simulated known samples for asbestos, lead, cadmium, zinc and solvents and in the blood lead testing programs from West Allis Memorial Hospital and the Center for Disease Control. Participation and approval from the latter determines whether the laboratory is OSHA approved for blood lead analysis.

A total of 3,465 recommendations were made by the Division. Follow-up visits ascertained that 144 of these had been completed. A system of tracking completion of recommendations is being instituted.

7(C)(1) ON-SITE CONSULATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7(C)(1) On-Site Consultation Program sponsored by the U. S. Department of Labor, Occupational Safety and Health Administration (OSHA), which provides on-site consultation on health and safety matters at the employers' requests.

During Fiscal 1986, 304 requests were received from employers for this free consultation service. Our staff of health consultants completed a total of 334 surveys which included complete and special hazard inspections and evaluations.

The majority of the consultation staff attended and completed a number of training courses given by the OSHA School in Illinois. These courses are in-depth studies of several different aspects of industrial hygiene, such as ventilation, noise, and hazardous materials.

The program has a large backlog of requests from all types of industries in Massachusetts.

We have received several letters from employers complimenting this voluntary consultative service.

RIGHT TO KNOW PROGRAM SUMMARY - FISCAL YEAR 1986

The Massachusetts Right to Know Law became effective on September 26, 1984, and the Division of Occupational Hygiene Right to Know Program was established shortly thereafter, on October 1, 1984.

The Projected Goals for FY 86 Were Outlined:

a. Establish a RTK Compliance Assistance Program to provide employers with technical consultative services for RTK compliance.

b. Establish a program to assist employers in obtaining MSDSs from manufacturers and suppliers under the "Request for Assistance" provision of the RTK Law. In addition, a system for compiling "substitute MSDSs", is to be set up (to be utilized when there is no available manufacturer from which to obtain an MSDS).

c. Continue improving the current system for maintaining ready access to technical information on the toxicologal properties and the health and safety hazards of chemicals in the workplace.

d. Develop several extensive, comprehensive educational resources (handbooks, brochures, manuals, fact sheets) to be used by employers for guidance in implementing the RTK requirements in their workplace.

During the first six months of FY 86, significant progress toward meeting the RTK Program goals outlined above was made. In addition, extensive training and orientation of the RTK staff was conducted during this time, including:

1. In-House RTK Staff Training/Orientation - Twice each month, seminar/discussion sessions were conducted for the purpose of orienting the DOH RTK Engineering Staff to the requirements of the RTK Law, as well as to DOH's responsibilities in the implementation of this law. Particular emphasis was placed on integrating industrial hygiene field work (described below) with the goals and objectives of the DOH RTK Program.

2. Industrial Hygiene Site Visits - Site visits were carried out in which a RTK Assistant Industrial Hygiene Engineer accompanied a State Side Hygienist and assisted in industrial hygiene site investigations in a variety of occupational settings. Each visit involved approximately one to two days of research and preparation (DOH procedures, toxicology of chemicals, methods of sampling and analysis), and one day to conduct the investigation. RTK observers were not responsible for writing the final report. Following this training RTK engineers carried out investigations alone and were responsible for the complete job, including report writing.

This comprehensive training program, in which particular emphasis was placed on field experience in the recognition, evaluation and control of chemical hazards in the workplace, has prepared the DOH Right to Know staff to provide comprehensive technical assistance to employers in addressing specific chemical hazards in the workplace within the framework of the Right to Know Law.

Preparation of Written Educational Materials is an integral part of the RTK Program.

a. A first draft of a comprehensive guide to the reading and understanding of MSDSs was completed.

b. A first draft of a RTK Employer Assistance Manual has been prepared. This manual is a comprehensive guide to the key requirements of the RTK Law and will be used when completed in the consultation program.

Technical Information Resource Development has been enhanced by the program with the following:

a. An MSDS microfiche service, covering over 3,000 chemicals was acquired from Occupational Health Services, Inc. of Secaucus, N.J. A microfiche reader/printer was also acquired.

b. Procedures were developed for screening manufacturers' MSDSs for accuracy and completeness.

c. "Substitute MSDSs" were compiled for PCBs and asbestos.

d. A draft protocol was developed for quickly compiling substitute MSDSs and having them reviewed by a "Medical Review Committee."

e. Several new materials for the technical resource library were purchased.

The major activities during the last six months of FY 1986 have been in the further development of the Massachusetts RTK Consultation Program and in the new involvement with the 7-C-1 OSHA Consultation Program. Concerning the latter activity, all DOH RTK Staff were trained in the rules and procedures of the 7-C-1 Program, and designated as OSHA consultants specifically for the Hazard Communication Standard.

Regarding consultation for the Massachusetts Right to Know Law, a pamphlet describing the "Consultation Program" was printed and circulated through bulk mailing to over 5,000 recipients, which included unions, professional and trade associations, occupational health nurses, Boards of Health, etc. Furthermore, information describing the services of this program was published in several trade and professional publications. Unfortunately, response from private companies for consultations for Massachusetts Right to Know and OSHA Hazard Communication has been slow; however, as enforcement activities at both the federal and state levels increases, a greater response is expected.

The most significant development regarding the Massachusetts Right to Know Consultation Program has been the encouraging response from municipalities for assistance in meeting the requirements of the RTK Law. Because of the complex nature of municipal consultations, and the increasing requests from cities and towns for these services, this area of activity is expected to make up a significant portion of work done by DOH RTK staff. Three important activities pertaining to municipal consultations, which have been studied and must be pursued further are the development of: (1) recommendations for the efficient use of RTK reimbursement funds. This is expected to be done with advisement from the Budget Bureau, (2) contract recommendations for use in purchasing private consulting services for RTK compliance activities, and (3) a uniform approach for RTK compliance by cities and towns. These activities are expected to require significant effort on the part of DLI for policy determination regarding RTK requirements for municipalities.

Since the effective operation of the DOH RTK Program depends, in part, on close association between this Division and the Division of Industrial Safety, a representative from the DOH RTK Program was appointed as liaison to each of the DIS Regional Offices. The purpose of this is to foster coordination and closer communication between the two Divisions, specifically regarding Right to Know, and is expected to enhance our activities in both the consultation and enforcement areas.

Two areas in which there has been minimal activity in the previous six months are: (1) The compilation of substitute MSDSs, and (2) publication of printed educational materials for RTK. However, preliminary discussions have been held pertaining to the establishment of a "Medical Review Committee." This is seen by DOH as an essential component of our efforts to compile MSDSs. Finally, educational materials, namely an "Understanding MSDSs" and "Massachusetts Right to Know Employer Assistance Manual" are expected to be completed during FY 1987.

Lastly, the Department of Labor and Industries has initiated a statewide newsletter on occupational safety and health. The writing, editing, layout and compiling of a mailing list are jointly done by the DOH Right to Know Program and the DIS Right to Know Office. The newsletter is mailed out to over 1,500 businesses, unions, and occupational health professionals, and will probably come out quarterly. It is expected to play a large role in communicating new developments (policies, programs, etc.) in the implementation of the RTK Law.

ASBESTOS PROGRAM

The Asbestos Program has been concerned with the disease-causing potential of exposure to airborne asbestos in schools and public sector buildings. The concern derives from epidemiological evidence linking exposure to airborne asbestos by asbestos workers to various types of cancer and non-malignant respiratory diseases. The Division of Occupational Hygiene, Environmental Protection Agency, National Institute for Occupational Safety and Health and the scientific community believe that any level of exposure to asbestos involves some health risk, although the exact degree of risk cannot be reliably estimated.

In December 1985, the Massachusetts Legislature passed an Act which authorized the Board of Education to expend a sum of up to twenty-five million dollars for removal, encapsulation or containment of asbestos in public school buildings and five million dollars for abatement in private schools. Beginning in February of 1986, the School Building Assistance Bureau (SBAB) of the Department of Education and the Division of Occupational Hygiene (DOH) met to set up the reimbursement program. All technical aspects of the program including approval of the abatement solution, review of bid specifications and final review of project completion are handled by the DOH, while the financial aspects of the program are handled by the SBAB.

In order to initiate the program, DOH had to establish criteria by which to rank the eligibility of a school for reimbursement money, draw up minimum bid specifications for any abatement jobs covered by reimbursement funds, determine the schools with the highest priority hazards, and develop form letters and protocols for the implementation of the program. Letters and forms developed include:

Priority I application letters

DOH Approval of Form 1-1

DOH Approval of Form 2-1

Missing Information Letter

Incomplete Bid Specification Letter

General Checklist

Bid Specification Checklist

Application Cover Letter

Telephone Correspondence Sheets

An extensive documentation and filing system was also established to track all phases of the program. The SBAB and DOH will mail out information on the public school program in July. The private school program is expected to begin in the fall of 1986.

In January 1985, an interagency task force was established to formulate and coordinate implementation of a comprehensive plan to address the problem of asbestos in buildings owned and occupied by the Commonwealth. Members of the asbestos task force include representatives of state agencies that are involved in asbestos issues from a technical and regulatory perspective. During the last year the task force has undertaken research to learn from the experience of others, explored a number of strategies, and taken action to test the usefulness of the various aspects of the comprehensive asbestos plan.

Effective April 25, 1986, the Environmental Protection Agency (EPA), in order to curtail improper and indiscriminate handling of asbestos in the public sector, has extended OSHA Asbestos Regulations on asbestos abatement projects to include public employees. This final regulation has an exemption (three square feet or three linear feet) allowing for routine repair.

It is generally recognized that employees can be exposed to significant amounts of asbestos when working with smaller amounts of asbestos if proper precautions are not taken. In order to prevent possible exposures, DOH is providing facility directors and state employees with specific instructions on safe work practices and procedures for incidental contact, i.e. three square feet or three linear feet. This instruction includes hands on "Glove Bag" training. There are approximately one hundred state facilities on line to receive this instruction.

RADIATION CONTROL PROGRAM

Staffing of the Radiation Control Program continued to be limited to one individual. The efforts of this individual were increasingly devoted to the administration of a nonionizing radiation program with a consequent decrease in the performance of compliance inspections of companies possessing ionizing radiation sources.

Following the public hearing held on June 28, 1985 on proposed Rules and Regulations relative to nonionizing radiation in the frequency range from 10 kilohertz to 100 Gigahertz, many comments were received from the broadcast industry and companies using RF heaters and sealers. The comments were carefully considered by an Ad Hoc Advisory Committee on Nonionizing Radiation. After review of a revised draft by the General Counsel of the Department of Labor & Industries, the Rules and Regulations, 440 CMR 5.00 were published in the Massachusetts Register on November 21, 1985 and became effective thirty days later. The Commonwealth became one of the first states in the nation to promulgate rules and regulations limiting occupational exposures to nonionizing radiation over the frequency range covered. As a consequence, many inquiries were received from within and outside the Commonwealth.

A major effort during FY 86 was one of education through the dissemination of information relating to 440 CMR 5.00. Approximately six hundred copies of the new Rules and Regulations were distributed to interested parties. Orientation seminars were conducted at the DOH facilities for the purpose of explaining the provisions of the new regulations together with technical briefings on nonionizing radiation, its biological effects, survey methodology and instrumentation. Additionally, the Industrial Radiation Control Supervisor participated as a speaker at a one-day seminar held by the Massachusetts Broadcast Association at the Natick Hilton during May 1986.

This seminar was attended by more than one-hundred representatives from the broadcast industry in Massachusetts and included station owners, chief engineers, and RF safety officers.

The new regulations limiting occupational exposures to nonionizing radiation are intrinsically linked to regulations issued by the Massachusetts Department of Public Health on public exposures. A number of nonionizing radiation surveys were performed jointly with Radiation Scientist personnel from the DPH, including surveys at the Commonwealth's fire watch towers at Andover, Barnstable, Georgetown, Pelham, Princeton, Sandwich, and Sudbury.

Twenty nine (29) new registrations of companies having sources of ionizing radiation were recorded. These registrations are in addition to the normal processing of additions, deletions, and changes to the registration of radiation sources among previous or existing registrants. Sources of ionizing radiation for which registration is required, encompass particle accelerators, gauges, and x-ray machines of various types, such as diffraction, spectrographic, fluoroscopic and radiographic. Additionally, various categories of radioactive materials are registered. It is estimated that over 5,000 sources in use by Massachusetts industry are currently registered.

Fifty-three (53) technical inspections were performed during FY 86 at companies having sources of ionizing radiation. These inspections were made to determine compliance with DLI Rules and Regulations, and resulted in a total of seventy-four (74) recommendations. Inspections were also conducted in the areas of nonionizing radiation, and twenty recommendations evolved from the surveys that were performed. Additionally, a number of employee complaints and an incident involving an over-exposed film badge were investigated and evaluated.

NURSING ACTIVITIES

The occupational health nurse was requested to serve on the Planning Committee for a Conference for Women in the Workplace. The conference was sponsored by the Commonwealth of Massachusetts under the direction of the Secretary of Labor, Secretary of Human Services, Secretary of Economic Affairs and the Commissioner of Public Health. Planning meetings were held on a bi-monthly basis until the conference was held. The two-day conference was well attended by approximately 1,200 working women and men in Massachusetts. Approximately sixty-five workshops were organized under three broad areas of concern: Occupational Health, Economics, and Social Issues. Two follow-up meetings of the conference were also held, and it is planned that a Working Women's Health Project will be established by the Department of Public Health.

Preparation of the report on the study of health effects of video display terminals in the workplace continued on a regular basis. The report was completed and submitted for printing in June 1986.

Plant visits were also made on a regular basis to assist with the establishment of new occupational health units as well as to evaluate existing units. Telephone requests for information continue to be received with priority on the need for medical directives, confidentiality issues and administration of over the counter drugs.

Monthly meetings were held from December 1985 until June 1986 with a group of occupational health nurses to review and suggest revisions to Bulletin No. 14, Care of Employees Injured or Taken Ill at Work. Suggested revision of the bulletin and the applicable law were submitted to the Department of Labor and Industries for review in June 1986.

MEDICAL PROGRAM

The occupational medicine physician has accompanied industrial hygienists on worksite evaluations in order to address health/medical related issues. Some examples included: advice about an emergency treatment program for cyanide poisoning in a company doing metal refinishing; assistance in the investigation of a death in a confined space which was determined to be caused by overexposure to fluorocarbon; examination of a worker with acute exposure to hydrogen selenide gas with a follow-up evaluation at the company making fiber-optic materials. The physician worked with other DOH staff to present an educational program on ethylene oxide to hospital employees following a worksite evaluation of a hospital sterilizing room.

The medical program has also assisted other DOH programs. A protocol was developed for assessing fitness for respirator use in conjunction with the Asbestos Program. The physician has worked with Right-To-Know on the "health effects" and "emergency care" sections of Material Safety Data Sheets.

We have also collaborated with other institutions and agencies on joint projects. Physicians at Dana Farber Cancer Institute noted that several patients with mesothelioma (cancer of the lining of the lung) worked at the same company which made cigarette filters from asbestos. DOH had past reports on this company and was able to assist the Dana Farber physicians in identifying other workers to be contacted and in providing information about exposures.

The DOH physician has also been working with the Massachusetts Childhood Lead Program to provide some follow-up for workers who develop lead poisoning as a result of deleading. The Medical Department has been active in educating physicans and other health professionals. Physicians in training (medical residents and occupational health residents) from Harvard University rotate through DOH, where they have the opportunity to participate on worksite evaluations and medical projects. The DOH physician has also given lectures in occupational health to physicians at community hospitals and health centers and to nurses' groups.

A project was started with the Massachusetts Poison Center in order to develop a system for follow-up of calls to the center concerning occupational exposures. Such a system, which includes DOH worksite evaluations when indicated, has the potential of providing action-oriented medical surveillance of occupational health problems. As an example, a call from a secretary at a warehouse complaining of headache and dizziness was immediately investigated by DOH. Excessive air levels of carbon monoxide were demonstrated and found to be due to inappropriate ventilation near the loading area. Workers were sent home while the problem was being corrected. Thus, the occurrence of more serious medical problems as avoided. It is hoped that the program with the Poison Center can be developed further in the future.

At the Conference on Women and the Workplace (11/85), the DOH physician co-led a seminar/lecture on Repetitive Trauma Disorders in the Workplace.

ETHYLENE OXIDE TRAINING

A union representative of SEIU 285 contacted the Division's physician to report several incidents of ethylene oxide (ETO) leaks from a sterilizer in the central supply area of a South Shore hospital. An industrial hygiene survey was performed, and recommendations were made to control exposure incidents. One of these recommendations was to provide workers with information on the toxic nature and proper handling of ETO. Sixteen people attended the Educational Session. The session was well received.

CARBON MONOXIDE EXPOSURE IN A BUSINESS OFFICE

Complaints of severe headaches, puffy eyes, and other related health problems were registered by office workers in a warehouse storage facility.

The source of the problem was a propane fueled forklift truck which was being used in one warehouse. The warehouse was found to be poorly ventilated.

Carbon monoxide and other combustion products from the forklift trucks were seen to easily permeate the office area. Recommendations were made to: (1) provide more general ventilation to the warehouse area; (2) provide better maintenance of the forklift truck; and (3) supply fresh air to the office area.

HIGH TRICHLOROETHYLENE EXPOSURE IN A SILVERSMITHING SHOP

A visit was made to a silverware manufacturing plant where an employee complained of exposures to irritant solvent vapors. The specific work location was not identified, but it was apparent from an inspectional tour that the problem was in the plating area where metal parts are cleaned in a vapor phase trichloroethylene degreasing unit. Personal samples taken on the degreaser operator revealed levels of exposure nearly three times the current standard (100 ppm). The exposure problem was due to three contributing factors: (1) poorly functioning cooling coils; (2) poor work practices resulting in excessive trichloroethylene drag-out; and (3) inadequacy of the ventilation system.

WORKER DIES FROM EXPOSURE TO FREON 12 GAS

Freon 12 or dichlorodifluoroethane has a low order of toxicity having an allowable limit of 1000 parts per million. The circumstances surrounding the fatal incident described here were very unusual. A worker was assigned to inspect the inside of a batch furnace used to convert acrylic fibers to carbon fibers. Prior to his entry, the furnace was pressurized with Freon 12 and then flushed with nitrogen gas. The worker equipped with a half-face chemical respirator was lowered into the furnace by a chain hoist. He quickly complained of respiratory difficulties and was removed from the furnace. An exhaust duct was then lowered to within 42 inches of the furnace bottom and ventilation was provided for 30-35 minutes. A second entry was tried. The worker inside the furnace appeared to be normal until he bent over to inspect the bottom of the furnace. Upon doing so he collapsed and was quickly hauled out. Total exposure time inside the furnace was estimated to be four to ten minutes. He was given cardiac pulmonary resuscitation until an ambulance arrived to transport him to a hospital where he was pronounced dead on arrival.

The furnace testing procedure was repeated a few days later to establish the furnace atmosphere. It was learned that the nitrogen flushing was inadequate. Levels of Freon 12 near the bottom of the furnace were as high as 215,000 ppm. The exhaust duct which was lowered to 42 inches of the bottom was not effective. The worker was subjected to a massive Freon 12 exposure and suffered from fatal ventricular fibrillation.

EXCESSIVE SOLVENT EXPOSURE FROM REBUILDING AUTO BRAKE SHOES

A complaint of strong solvent exposure was received from an employee engaged in the rebuilding of auto brake shoes. The plant receives used brake shoes and relines them for resale to auto repair shops. Prior to relining, the brake shoes are washed with isopropyl alcohol in a dip tank. The tank was provided with hood type ventilation, but it was inadequate. Recommendations were made relative to improving work practices and increasing the ventilation capacity of the hood system.

WOOD DUST EXPOSURE IN A HOSPITAL CARPENTER SHOP

A call was received from a carpenter shop employee who expressed concern about his dust exposure when sawing fir plywood. He and other employees were experiencing respiratory symptoms. Tests performed by our agency showed that in fact dust levels were excessive and reported to be over five times the standard of 5 mg/M^3 recommended by the ACGIH for soft woods. Ventilation was provided to the work area, but it was apparent from observation and test results that it was inadequate. A recommendation was made to discontinue the operation until a dust collection system is installed.

D.E.Q.E. COURSE

A course offered by D.E.Q.E. to Right to Know Municipal Coordinators was attended by five members of the D.O.H. Right to Know Staff to learn the functions and issues concerning Municipal Coordinators.

RTK STAFF MEMBERS PRESENT TALKS

1. North Shore Health Planning Council A member of the Right to Know staff presented a lecture on the current status and requirements of the Massachusetts Right to Know Law in conjuction with a representative of the Regional OSHA Office who spoke about the Hazard Communication Standard. The audience participated in a problem-solving exercise with the two speakers in which two MSDSs were studied and discussed.

2. Occupational Health Seminar/HSPH A member of the Right to Know staff gave a lecture to faculty and students of the Harvard School of Public Health regarding the Right to Know implications in a workplace fatality.

3. New England Pest Control Association A member of the Right to Know staff presented a lecture and discussion at a business meeting of the New England Pest Control Association attended by approximately 60 members. The main issues discussed covered outside of the basic requirements of the law the specific exemptions for pesticide applicators and special cases for contractors.

4. Boston University Nurses' Association A member of the Right to Know staff addressed the BU Nurses' Union, Service Employees International Union, and discussed the functions of the Division of Occupational Hygiene. In addition, the provisions of the Massachusetts Right to Know law were presented and discussed.

5. Tantasqua School District Teacher Conference A representative from the Right to Know section made a presentation at the Tantasqua School District Teacher Conference on September 29th in Sturbridge, MA. The two topics that were discussed included the MA RTK Law and Health and Safety in Vocational Schools. The audience consisted of vocational school instructors, chemistry and general science teachers as well as a school administrator.

ACUTE EXPOSURE TO LEAD

A request was made to evaluate exposure in the manufacture of lead shields for the radiation industry. The process involves cutting, sanding, filing, and burning operations. Tests performed at each of these operations showed levels in excess of the current standard of 0.05 mg/M^3. One operation which contributed to the excess levels involved power sanding of lead sheets.

Lead levels reached as high as 4.8 mg/M^3, nearly 100 times the acceptable levels. The worker performing this task wore a Type B respirator, but other workers in the immediate area were not satisfactorily protected. Recommendations were made to install local exhaust ventilation units at every workstation.

HEAVY PARTICLE BOARD DUST EXPOSURE

A visit was made to a woodworking shop to evaluate exposure to particle board and pine dust. Air tests showed that dust concentrations reached as high as 32 mg/M^3 (twice the OSHA standard) when material was being cut on bench saws. The saws were not provided with local exhaust ventilation or dust collection systems. The dust exposure at this plant was described as a dust cloud thus posing potential health and explosion hazards. The operation was brought under control with the installation of proper ventilation.

SOLVENT EXPOSURE IN STORAGE ROOMS INVESTIGATED

A request was made to evaluate solvent exposure in a chemical storage area of a furniture manufacturing plant. The areas were totally enclosed and poorly ventilated. Tests of individual solvents stored showed that concentrations in general did not exceed the OSHA standards. The situation was quite different when total solvent exposure was calculated as a mixture. Toluene levels, on this basis were found to be excessive. Recommendations were made to increase ventilation in the storage areas.

HAZARD COMMUNICATION SEMINAR

The New England Legal Foundation sponsored a half-day conference on OSHA Hazard Communication. This session was attended by two members of the Right to Know staff. Five attorneys within the foundation presented information in the following areas:

- Material Safety Data Sheets
- Labeling
- Training
- Trade Secrets
- Future Preemption and the effects of the new Superfund law.

STATE-WIDE CONFERENCE ON WOMEN IN THE WORKPLACE

On November 8 and 9, 1985 over 1,000 women and men gathered at the Women in the Workplace Conference at Northeastern University. The conference was co-sponsored by the Massachusetts Department of Public Health, Executive Office of Human Services, the Executive Office of Labor, and the Executive Office of Economic Affairs all working in cooperation with the Governor's Office on Women's Issues.

The program included keynote addresses by U.S. Representative Patricia Schroeder and former OSHA head Eula Bingham as well as sixty-eight workshops on social, health, and economic issues.

D.O.H. staff participated actively in the planning committee, developing and presenting workshops on subjects ranging from reproductive hazards and occupational health problems associated with repetitive motion to occupational health hazards for women of color. Seven staff members acted as recorders for conference workshops and assisted with registration. Many others attended several workshops.

HYDROGEN SULFIDE EXPOSURE

An overexposure to hydrogen sulfide was found at a sewage treatment plant in the sludge handling building. It was discovered that due to a faulty pump hypochlorite was not being added to the process. Following repair of same levels decreased.

"IMAGINE"

A number of the RTK staff attended a two-day training course in the "Imagine" computer query program designed to access information from MSDSs in DEQE's files on the main frame. It was sponsored by Multiplications Software who designed the program and was held at MDC in Boston.

NEAIHA ANNUAL ALL DAY SEMINAR

Several members of the Division attended the NEAIHA seminar on Computers in Industrial Hygiene held in Sturbridge. Subjects discussed included data storage, analytical calculations, industrial safety and health program management, and telecommunications.

INDOOR AIR QUALITY PRESENTATION AT A NATIONAL MEETING

A member of the Division presented an "invited" paper at the American Public Health Association's 113th Annual Meeting in Washington, D.C. in November 1985. The paper, entitled "Environmental Quality and Reported Health Symptoms among Massachusetts Office Workers," was part of a session on Indoor Air Pollution, and presented the results of a year-long study of clerical workers in 34 companies and Massachusetts departments.

The results presented showed: 87% of non-smokers were exposed to cigarette smoke at work; non-smokers exposed to cigarette smoke had an increased prevalence of vision complaints, colds or sore throats and headaches; and a combined measure of indoor air quality was related to increased colds or sore throats.

ETHYLENE OXIDE STERILIZATION

Following the discovery of an ethylene oxide leak from a gas sterilizer and the lowering of the OSHA Standard from 50 ppm to 1 ppm for ethylene oxide, a call was received by the Division requesting information and a survey of a Massachusetts hospital central supply area regarding the same. An extensive survey of the area was made and work practices of the personnel were observed. A total of six recommendations were made and completed. Two of the major recommendations which were followed were relocating one of the sterilizers to eliminate a second source of possible exposure as well as eliminating a second restricted area. An alarm which provides a warning of leaks as well as a signal for evacuation of the area was installed. The latter is the first of its kind to be installed in the New England area.

ASBESTOS REMOVAL

A request from D.E.Q.E. was made to investigate an asbestos removal at a country club following observation of asbestos debris in areas which were considered by the contractor as being "clean." The polyethylene sheeting had been taken down in these areas. Final cleaning was being conducted in one remaining area at the time of the initial D.O.H. visit. Six bulk samples of debris were taken from the carpet of the "clean" areas. All six contained amosite asbestos. Recleaning of these areas was recommended. A follow-up visit was made upon completion of cleaning. Three areas were still found to contain asbestos debris. Immediate clean-up of these areas was recommended. Air samples were taken. Upon picking up the pumps at the end of the day, debris was still detected in one area. Based on this find and elevated air sampling results (.02 - .07 f/cc), it was recommended that the country club management call the contractor back in to reclean all areas and all adjacent areas where contamination most likely spread.

DRY CLEANING ESTABLISHMENT - SOLVENT EXPOSURE

A site visit was made to a small dry cleaning establishment to investigate an employee complaint of medical symptoms related to exposure to dry cleaning solvents. Vapors of perchloroethylene were emitted every twelve minutes when the doors to the washing machine and dryer were opened. A level of 168 ppm (time-weighted average) was detected. The ACGIH threshold limit value is 50 ppm. The recommendation made to reduce exposure involved the installation of a fan and ductwork to vent the vapors to the outside of the building. The pressers were also overexposed due to the application of high temperature and steam to clothes that had not been adequately dried. In addition, there were safety hazards, improper use of spot cleaners, and no heat in the building. There was no implementation of the Right to Know Law.

IMPLEMENTATION OF NIOSH TEST PLAN

Two members of the staff were involved in implementing a NIOSH Test Plan to determine residual concentrations of PCB's, polychlorinated dibenzofurans and polychlorinated dibenzo-p-dioxins on fifty floors of an office building.

HEALTH HAZARD SURVEY OF AN ARTS AND CRAFTS SHOP

A comprehensive health hazard survey of an Arts and Crafts Shop was conducted by two of our industrial hygiene consultants. The mixing of pottery clay, which involves the pouring of crystalline silica sand, was being performed in a poorly ventilated room. Atmospheric tests taken on the mixing operator revealed concentrations greatly exceeding the OSHA permissible exposure limit for crystalline silica. Other tests performed during this survey included cobalt and iron oxide sampling of the ceramics glazing operator, sulfur dioxide and carbon monoxide measurements in the kiln area, hydroquinone and acetic acid sampling in the Photography Shop, and heavy metal sampling in the Metal Shop. These air tests revealed concentrations below their respected OSHA permissible exposure limits. Recommendations to properly ventilate the clay mixing hopper and the ceramic kilns were made.

SOLVENT EXPOSURE IN A FILM MANUFACTURING PLANT

Our industrial hygiene consultants were invited to a company which manufactures polycarbonate film to determine solvent exposure to employees. Chloroform, methyl chloroform, toluene, and methyl cellosolve were the common solvents used in the film production. These solvents were piped directly from holding tanks to the mixing machines. Although local exhaust ventilation systems on the machines were more than adequate, employee exposures greatly exceeded the OSHA permissible exposure limits for these solvents. A further investigation revealed leaks in the solvent lines which were responsible for the high solvent concentrations. Recommendations were made for periodic leak detection and maintenance of solvent lines as well as better housekeeping practices by employees.

FEBRUARY NEAIHA MEETING

A member of the Right to Know staff attended the NEAIHA Meeting on Non-Ionizing Radiation held at the Harvard School of Public Health. The lecturer discussed the health hazards of various sources of non-ionizing radiation. Special emphasis was placed on the uses and hazards of lasers in new technology.

ASBESTOS FIREPROOFING DISTURBED IN WAREHOUSE

An investigation of the nature and condition of reported asbestos fireproofing in a large retail and wholesale distributors's warehouse was made. The coating, which was analyzed as containing 70-80% amosite asbestos, was present on a short ceiling by the loading dock and on walls throughout the warehouse. Electrical work done the previous day created debris which was left in a well-traveled area. The walls and ceiling had evidently experienced some damage from the warehouse storage and shipping activities.

It was recommended that any observed debris be cleaned up using appropriate methods immediately. Mechanical means of preventing damage to walls and ceiling were also recommended. Long-term planning for dealing with the asbestos hazard was urged.

CONFERENCE ON "NON-OCCUPATIONAL EXPOSURE TO ASBESTOS"

On March 6-7, 1986, four members of the Asbestos group attended a course on Non-Occupational Exposure to Asbestos offered at and by the Johns Hopkins University, Medical Campus.

The following is a course description with respective lecturers:

March 6, 1986

Historical Summary of Recognition of Asbestos Disease
J.K. Corn

Manifestations of Asbestos Disease
J. Keogh

OSHA Risk Assessments
J. Martonik

Approaches to Quantitative Risk Assessment of Asbestos in Non-Occupational Exposures
M. Tockman

State Requirements
F. Whitehead

Current EPA Guidelines for Asbestos in Schools
D. Mayer

Case Study of Sampling and Evaluation of Asbestos in a School Building: Bulk and Air Sampling Procedures and Results
P.S.J. Lees

March 7, 1986

Electron Microscopic Evaluation Methods for Asbestos-In-Air
M. Thorpe

Light Microscopic Evaluation of Asbestos-In-Air
C. Spooner

Current Status of Asbestos School Litigation
D.A. Speights

Management and Program Ingredients: Overview, Qualitative Evaluation Factors and Decision Matrices
M. Corn

Management and Program Ingredients: Quantitative Evaluation and Options for Control
M. Corn

Among course participants were industrial hygienists, lawyers, medical professionals and insurance company representatives.

HARVARD UNIVERSITY CONTINUING EDUCATION COURSE

On March 24-28, 1986 two members of the staff attended Harvard University's Continuing Education course in the "Fundamentals of Industrial Hygiene."

Topics covered included: OSHA Regulations and sampling strategies, principles of ventilation, exposure to dust, chemical and physical asphyxiants, physics of sound, and a variety of other short courses. At the end of each day hands-on laboratory sessions on instrumentation and its proper use were provided.

While the course was quite rigorous in the amount of material covered, it was both interesting and helpful.

EPA PERSONAL PROTECTION AND SAFETY TRAINING COURSE

A member of the staff attended this course held at the Massachusetts Fire Fighting Academy in Sudbury from March 24-28, 1986

The five-day course was designed for hazardous waste response teams. It included lectures on hazard recognition, site entry and personal protection and incident evaluation. Each student calibrated and used several field instruments including an OVA and a MIRAN.

Participants became familiar with procedures of donning and doffing protective clothing, i.e., fully encapsulating suit and self-contained breathing apparatus. Lectures on respirators and other personal protective clothing were also given. Decontamination of this clothing was addressed as well.

INTRODUCTION OF DEPARTMENT NEWSLETTER

In April 1986, the first issue of the newsletter Health and Safety on the Job: Common Health in the Commonwealth, was printed and mailed. This is the first time the Department of Labor and Industries has done a newsletter on occupational safety and health. The purpose of the newsletter is to educate and inform interested parties of the latest information on workplace hazards and activities of the Department.

Over 3,500 copies of the newsletter were distributed to union locals, occupational health nurses, industrial hygienists, companies, occupational health clinics, non-profit groups and the public sector including state, county, and municipality levels.

It is planned that the newsletter will come out four to six times a year and that its mailing list will grow. The Divisions of Occupational Hygiene and Industrial Safety will continue to collaborate on this project.

NEW ENGLAND LABORER'S TRAINING ACADEMY

Two members of the Asbestos staff attended a course at the N.E.L.T.A. on Safe Asbestos Removal on March 31 - April 2, 1986.

The course focused on the health effects of asbestos; the importance of the use of protective equipment; personal respirator test-fitting; appropriate work practices and procedures for asbestos removal, including employing engineering controls; the OSHA provision for medical surveillance; and a discussion on relevant federal and state regulations and guidelines.

All other participants of the course were union laborers.

D.O.H. AIDS DEPARTMENT OF CORRECTIONS

The Division of Occupational Hygiene is assisting the Department of Corrections in the accreditation of their facilities by the American Correctional Association. The code requires verification of their standards by an appropriate agency. Visits have been made to a number of these facilities to ascertain that the standards for light, noise, and adequate ventilation in sleeping quarters are being met.

OCCUPATIONAL AND ENVIRONMENTAL HAZARDS TO REPRODUCTION CONFERENCE

Three members of the staff attended a three-day conference on April 28-30, 1986 covering many technical, epidemiological and legal issues involved with reproductive hazards. Much of the information was being presented for the first time and was very current. Some of the occupations examined were farm workers, plastic industry workers, nurses, hospital workers and arts and crafts. Some of the hazards that were presented were heat, methylene chloride, antineoplastic drugs and lead. Contacts were also made with other occupational health and right-to-know programs.

AMERICAN PUBLIC HEALTH ASSOCIATION SEMINAR

The APHA held a meeting of its Occupational Health Section at Rutgers University, New Brunswick, NJ, April 11-12, 1986. A member of the Division attended the workshops titled:

1. Perspectives on Plant Inspections: The issues discussed included the effects of prior notification for inspections, effects on workers, privacy in interviewing workers and review of management files.

2. Solvents/New Trends: This was a panel discussion by experts from a wide range of regulatory and research agencies and hospitals. The focus was mostly on carcinogenicity studies and special emphasis was placed on new findings on methylene chloride and 1,1,1-trichloroethane.

3. The Industrial Hygienist as Labor Educator: This workshop looked at the role of the industrial hygienist both in and out of the workplace. Discussion focused primarily on the IH's access to workers for purposes of education and on the difficulty of distilling technical information into a form useful to workers.

4. Right to Know and Hazard Communication: The primary areas discussed included the role of the industrial hygienist in conveying Right to Know information, the difficulty of incorporating RTK and Hazard Communication into regular IH duties and updates on the preemption of RTK laws by Federal Hazard Communication Standard.

STAFF MEMBERS ATTEND COURSE AT HARVARD SCHOOL OF PUBLIC HEALTH

Three members of the Asbestos Program attended a course on Sampling and Evaluating Airborne Asbestos Dust on May 5-9, 1986. The program covered in detail techniques of asbestos sampling and evaluation. Topics included requirements of asbestos sampling, equipment and procedures, calibration techniques, use of the microscope, counting procedures, filter preparation and mounting and sample evaluation. The new 7400 method was demonstrated.

INITIAL COMPLIANCE COURSE FOR INDUSTRIAL HYGIENISTS

Two members of the 7(C)(1) Program attended a three-week course designed to familiarize new OSHA compliance officers with OSHA standards, the field operations manual, hazard recognition, abatement assistance and compliance in inspection techniques. Laboratories on the calibration and use of full shift and direct reading sampling instruments were conducted to augment in class lectures. A mock OSHA inspection was done by each student at the end of the course to evaluate their ability to correctly sample for contaminants and to identify the proper selection of respiratory and personal protective equipment as well as evaluate engineering controls.

FOLLOW-UP OF LEAD EXPOSURE IN A SALVAGE SHOP

Recommendations to install local exhaust ventilation and a fogging unit with the water supply over the area for cutting had been made to management of a reclamation plant. The company responded by moving the operation to another room and increased the water supply over the rolled cables.

In February a dramatic increase was noted in the blood lead levels of employees. It was learned that most of the workers are transient and blood lead monitoring had not been done on any regular basis. Two of the workers had already left the job. It was alleged that two others had previously worked repairing auto radiators which is another known source of lead exposure, however, pre-employment blood leads had not been taken. This Division recommended a routine blood monitoring program so that the employees would have a pre-employment lead level drawn and would be monitored at least as frequently as the lead standard states. In the interim, an OSHA Compliance Officer has been involved and is monitoring these results closely. Following awareness of the elevated blood lead results, work practices were evaluated several times by the Division. Smoking, eating, and drinking in the work area as well as improper use of respirators were observed.

Management has implemented a no smoking, eating, or drinking policy in the area, but improper use of respirators has continued with some employees. Implementation of engineering controls has been recommended again and appears to be the only means to reduce exposure as the blood leads still remain above the permissible exposure limits stated in the lead standard.

SAFETY AND HEALTH SEMINAR

Two engineers attended a day long seminar on Safety and Health in Hospitals at the Sheraton-Lincoln in Worcester. Talks pertained to chemical, biological, and physical hazards in hospitals. One major concern was ethylene oxide. Health effects of ETO, the ETO OSHA Standard, effective ventilation and work practices were among issues discussed.

AMERICAN INDUSTRIAL HYGIENE CONFERENCE

Nine members of the Division staff attended the American Industrial Hygiene Conference held in Dallas, Texas, May 18 to May 23. The theme for the conference this year was "Protection For All." Two of the members took the first part of the examination for certification as Industrial Hygienists. As well as participating in the technical sessions presented in specialized occupational health and safety field, members were enrolled in the following professional development courses:

Industrial Hygiene in an Office Environment was an advanced level course for industrial hygienists concerned with indoor air pollution and workplace hazards encountered in commercial and public office buildings.

Fibrogenic Dusts was a course reviewing all aspects of the respiratory system including diagnosis, therapy and complications of diseases caused by fibrogenic dusts, especially various forms of silica and silicates.

Occupational Hazards to Hospital Workers focused on providing information for identifying hazardous operations, processes and departments in hospitals and discuss feasible control measures for same as well as further developing existing hospital resources for worker protection.

Common Industrial Hygiene Sampling Errors emphasized that the introduction of new sampling and analysis methods has increased the magnitude of sampling errors. Examples of sources of errors discussed included sampling train preparation and placement, equipment deterioration and maintenance and sample protection. Analytical errors were also discussed.

Structure Activity Relations in Toxicology included a survey of organic chemicals by compound class and discussed how chemical structure affects biological action.

Employee Training Programs: How to Achieve Cooperation and Compliance included: (1) a review of federal and state laws and standards requiring training; (2) discussion of basic concepts and requirements of a successful training program; (3) specific guidelines for setting up a program; (4) methods of evaluating the effectiveness of a training program.

Troubleshooting Exhaust Ventilation Systems included discussions of common problems encountered in industrial exhaust systems such as causes, remedial actions, testing, and prevention.

Introduction to Inhalation Toxicology provided students with an understanding of toxicology produced by inhaled chemicals including sensory and pulmonary irritation, asphyxiation, pulmonary hypersensitivity and pneumoconiosis.

Another opportunity provided by attendance at this conference are the exhibits and demonstrations of all the latest sampling equipment, respiratory protection equipment, etc. It provides the ability to make comparisons between the different models and makes at the same time rather than setting up appointments with different salesmen to exhibit their equipment.

EMPLOYEE LEAD EXPOSURE AT WIRING COMPANY

An inspection was conducted at a wiring company on June 6, 1986 in response to an allegation that two employees had been taken by ambulance to local hospitals for apparent symptoms of acute lead poisoning. An abrasive blaster had been hired on contract to blast the paint off the walls of two floors of the large brick structure. The paint was lead-based and in the process of removal the contractor blasted asbestos pipe lagging from the steam pipes. Company employees were assigned to clean up the contaminated debris by shoveling it out the windows into a large dumpster. Employees worked without benefit of respiratory protection under conditions of very high lead dust levels. The airborne concentration exceeded the OSHA action limit for lead four days after the removal had ceased.

The inspection was made in conjunction with representatives of the Woburn DEQE office and the North Andover DIS office. DEQE issued an administrative order to the company to seal off the building and to halt all renovation until a plan had been approved by the Department. The case was referred to OSHA by this office for enforcement of medical monitoring requirements of the lead standard.

NON-IONIZING RADIATION MEETING

The American National Standards Institute (ANSI) requires that its standards (guides) be reviewed at five year intervals. Subcommittee IV to the Standards Committee on Radiofrequency (RF) Radiation Hazards, C-95 met at the University of Wisconsin on June 6 and 7, 1986. Subcommittee IV is by charter concerned with Safety Levels and/or Tolerances with Respect to Personnel. The Division's Industrial Radiation Control Supervisor who was invited to serve as a member of the nationwide subcommittee IV, attended the meetings at Madison, Wisconsin. The purpose of the meetings was to review and reconsider the 1982 C95 consensus standard with respect to human exposure to RF Electromagnetic Fields, 300 kHz to 100 GHz. The two day meetings were devoted to a detailed technical review of a draft of a proposed revision to the ANSI C95.1-1982 standard.

LEAD HAZARDS CONFERENCE

On June 13, 1986 a Senior Engineer from the Division was a guest speaker at a conference held at the State Laboratory Institute sponsored by the Childhood Lead Poisoning Prevention Program entitled "Addressing Lead Hazards in Housing Lead Hazards in Housing Rehabilitation: The Cost and Safety Factors". The representative presented case studies, addressed safety issues on the job, and as well as assessed lead paint removal methods and the effectiveness of safety equipment.

Several other members of the staff attended the conference.

NIOSH VENTILATION COURSE HELD AT D.O.H.

For the first time ever, the Division of Occupational Hygiene hosted a week-long training course, from June 2-6. The course was conducted by the National Institute for Occupational Safety and Health (NIOSH) and focused on ventilation systems. Since ventilation (local exhaust and general dilution) is often the most important form of engineering control for protecting workers from hazards, the training was an invaluable addition of expertise for the attendees. The entire industrial hygiene staff from D.O.H. received the training since it was held at the Division's facilities and no travel or housing costs were incurred. Staff from the Division of Industrial Safety was also provided the opportunity to participate.

MOSES SPONSORED COURSES

Throughout the year several members of the staff participated in short courses sponsored by MOSES. They were Time Management, Writing Communication Skills, Public Speaking, Fundamentals of Supervision, and the latest was the Handling of Hazardous Waste.

UNIVERSITY OF MASSACHUSETTS INSTITUTE FOR GOVERNMENTAL SERVICES PROGRAMS

Two members of the staff participated in and graduated from Management Programs offered by the Institute of Governmental Services.

The Asbestos Program Manager participated in the Tier I Program which is titled Management Skills for Massachusetts Supervisors and is designed to provide agencies with the in-house capacity to train first and second line supervisors. The ten days of instruction emphasize public speaking, and training techniques as well as management skills.

The Chief of Laboratory attended the Tier III Program. The curriculum offered included the following: Management in the Public Sector, Management of Change, Public Relations and the Media, Labor Relations, Management of Personnel, Office Automation, Public Sector Budgets, Current Economic Policy, and Planning for the Future. In order to graduate, the completion, and submission of an application project was necessary. The participant's project was entitled "Computerization of Work."

OCCUPATIONAL HEALTH SEMINARS

In September, 1985 the Division of Occupational Hygiene resumed its Occupational Health Seminar program on a monthly basis. Each month an issue of vital importance in occupational health is presented by either the technical or medical staff at the Division or outside professionals. Speakers from other agencies included John Kominsky, C.I.H., from the National Institute for Occupational Safety and Health; Laura Punnett, Ph.D., from the Center for Ergonomics (at the University of Michigan); and Jim Cone, M.D. from San Francisco General Hospital's Occupational Health Clinic.

The program has grown with time, and now over forty health professionals statewide are on the mailing list. They represent state and local agencies, occupational health clinics, Corps of Engineers, universities, community groups and private business. Attendance has been high, with over ten different agencies and groups represented at each session.

The following is a list of the seminars presented to date:

- Freon-Induced Death: Industrial Hygiene and Health Considerations
- Asbestos: Current Issues and Concerns
- Occupational Health in Alaska: A State Agency Perspective
- Evaluating Ergonomic Factors as Part of the Work-Site Survey
- Non-Ionizing Radiation: Overview of the New Workplace Regulations
- PCB's: An Update on Hazards, Sampling Techniques and Concerns
- Lead Exposure on the Job
- Reproductive Hazards on the Job
- Neurotoxicity of Solvents used in the Semiconductor Industry

D.O.H.

ENVIRONMENTAL MEASURMENTS

(Measurements made with Direct Reading Instrumentation)

Substance or Condition	Number	Found In Harmful Exposure Range
Radiation		
Beta, Gamma Radiation	614	13
X-Radiation	219	2
X-Ray Diffraction	10	0
Ionizing Radiation	56	0
Non Ionizing Radiation	561	18
RF Sealers Heaters	60	30
Induction Heaters	100	40
Noise	496	159
Ventilation	736	152
Illumination	5	3
Humidity	249	38
Temperature	249	0
Acetic Acid	6	3
Acrylonitrile	3	2
Ammonia	39	0
Carbon Dioxide	1,391	487
Carbon Monoxide	390	57
Chlorine	11	1
Combustible Gas, N.O.C.	11	0
Ethylene Oxide	78	19
Formaldehyde	18	0
Hydrazine	3	0
Hydrocarbons	9	1
Hydrochloric Acid	13	0

ENVIRONMENTAL MEASUREMENTS
(continued)

Substance or Condition	Number	Found In Harmful Exposure Range
Hydrofluoric Acid	3	0
Hydrogen Sulfide	8	0
Mercaptans	4	0
Mercury	171	13
Methanol	3	3
Methyl Chloroform	3	2
Nitrogen Dioxide	25	0
Nitrous Fumes	53	0
Oil Mist	1	0
Oxygen	18	12
Ozone	14	0
Perchloroethylene	51	5
Sulfur Dioxide	22	1
Trichloroethylene	3	0
Total	5,713	1,063

AIR AND BULK SAMPLES COLLECTED

Substance	Number	Found In Harmful Exposure Range
Acetic Acid	15	0
Acetone	33	0
Acrylonitrile	5	0
Aluminum Dust	3	0
Aluminum	2	0
Aluminum Oxide	1	0
Ammonia	28	0
Antimony	2	0
Arsenic Pentoxide	3	0
Asbestos Bulk	2,175	1,300
Asbestos Air	207	6
Asphalt Fumes	7	0
Benzene	2	0
Beryllium	11	0
Butadiene	5	0
Butanol	38	0
Butoxyl Ethanol	30	0
Butyl Acetate	49	0
Butyl Cellosolve	7	0
Cadmium	10	0
Carbon Tetrachloride	2	2
Cellosolve	5	0
Cellosolve Acetate	6	0
Chlorine	9	0
Chloroform	14	13

AIR AND BULK SAMPLES COLLECTED
(continued)

Substance	Number	Found In Harmful Exposure Range
Chromic Acid	8	0
Chromium	10	0
Clay	2	0
Cobalt	20	2
Copper	26	4
Copper Fume	3	0
Copper Oxide	2	0
Creosote	5	2
Cyanide	3	0
Cyclohexanone	16	0
Diacetone Alcohol	4	0
Diesel Fuel Supplement	1	0
Diiosobutyl Ketone	16	0
Dibutyl Phthalate	2	0
Diethyl Amino Ethanol	2	0
Diethyl Triamine	2	0
Diphenyl Methane	1	0
Dust Identification	1	0
Wood Dust	6	7
Total Dust	12	7
Respirable Dust	5	0
Epichlorohydrin	2	0
Ethanol	65	0
Ethanolamine	1	0
2-Ethoxyethanol	14	0

AIR AND BULK SAMPLES COLLECTED
(continued)

Substance	Number	Found In Harmful Exposure Range
Ethoxyethyl Acetate	2	0
Ethyl Acetate	33	0
Ethyl Benzene	3	0
Ethyl Glycol Acetate	2	0
Ethyl Methacrylate	8	0
Ethylene Diamine	1	0
Ethylene Oxide	119	38
Fluoride	4	0
Formaldehyde	106	0
Freon 11	1	0
Freon 12	5	4
Freon 113	32	0
Furfural Alcohol	1	0
Gas Chromatograph Scan	43	0
Glycol Ether	16	0
Glycol Ether Acetate	2	0
Graphite	2	0
Heptane	2	0
Hydrazine	1	0
Hydrofluoric Acid	3	0
Hydrogen Chloride	10	0
Hydrogen Cyanide	3	0
Hydrogen Sulfide	7	3
Hydroquinone	4	0
Iron	1	0

AIR AND BULK SAMPLES COLLECTED
(continued)

Substance	Number	Found In Harmful Exposure Range
Iron Oxide	21	2
Isobutyl Acetate	27	0
Isobutyl Alcohol	18	0
Isophorone	9	0
Isopropyl Acetate	19	0
Isopropyl Alcohol	57	1
Lead	149	91
Manganese Dioxide	22	0
(MDI) Methylene Bisphenyl Isocyanate	10	0
Metal Scan	2	0
Metal Fumes	4	0
Methanol	25	12
Methyl Cellosolve	7	0
Methyl Chlorform	36	0
Methyl Ethyl Ketone	18	0
Methylene Chloride	74	7
Methyl Methacrylate	2	0
2-Methoxy Methanol	15	0
Methyl Isobutyl Ketone	73	2
Mineral Spirits	12	13
Molybdenum	1	0
Nickel	16	0
Nickel Chloride	1	0
Nickel Sulfate	1	0

AIR AND BULK SAMPLES COLLECTED
(continued)

Substance	Number	Found In Harmful Exposure Range
Nitric Acid	6	0
Oil Mist	2	0
Ozone	24	5
Perchloroethylene	41	4
Petroleum Distillates	140	0
Phenol	8	0
Phosphoric Acid	2	0
Polychlorinated Biphenyls	28	0
Pyrethrum	3	0
Silica	18	2
Silicon	3	0
Sodium Hydroxide	5	0
Styrene	19	0
Sulfur Dioxide	2	0
Sulfuric Acid	6	0
Tin	4	0
Toluene	100	0
Toluene Diisocyanate (TDI)	7	0
TCE	2	0
TCP	2	0
1,1,1 Trichloroethane	62	2
Trichloroethylene	15	1
Turpentine	9	0
Vinyl Chloride	3	0
VMP	2	0

AIR AND BULK SAMPLES COLLECTED
(continued)

Substance	Number	Found In Harmful Exposure Range
Welding Fumes	9	0
Xylene	95	0
Zinc	7	0
Zinc Oxide	3	0
Zirconium	2	0

FIELD WORK SUMMARY

Section	Visits	Meetings	Talks
State Program	475	207	29
7-C-1	334	27	7
Asbestos Program	805	124	36
RTK	150	69	39
TOTAL	1,764	427	111

LABORATORY WORK

Asbestos Bulk Samples	2,175
All Other Samples Analyzed	2,131
Urine Mercury Samples	917
Blood Leads	2,232
Blood Zn protoporphyrins	2,221
Proficiency Analytical Testing Program	
Asbestos	16
Cadmium	16
Lead	16
Solvents	48
Zinc	16
CDC Blood Lead	12
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RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Accident Prevention
1169	1	Welding Explosions
		Chemical Data Sheets
1233	1	Formaldehyde
1234	2	Carbon Tetrachloride
1144	3	Benzene
1236	4	Carbon Disulfide
1329	5	Chromates
1342	6	Carbon Monoxide
1328	7	Trichloroethylene
1317	8	Ammonia
1326	9	Mercury
1279	10	Hydrogen Sulfide
1354	11	Fluorides
1149	12	Cadmium
1073	13	Methanol
1361	14	Lead
1180	15	Methyl Ethyl Ketone
1048	17	Acetone
1302	20	Oxides of Nitrogen
1292	21	Petroleum Naphtha
1309	22	Zinc
1323	23	Sulfur Dioxide
1129	24	Cyanides
1251	25	Organic Acetates
1370	26	Toluene
1396	27	Perchloroethylene
1182	28	Beryllium
1074	29	Methyl Chloroform
1255	30	Uranium
1043	31	Butyl Alcohol (N-Butanol)
1369	32	Parathion
1316	33	Isocyanates
1185	34	Epoxy Resins
1366	35	Ozone
1261	36	Chlorine
1262	37	Styrene
1263	38	Aniline
1282	39	Xylene
1285	40	Inorganic Arsenic
1301	41	Tetrachloroethane
1303	42	Dioxane
1367	43	Ethylene Oxide

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Medical Data Sheets
1371	1	Anthrax
1350	2	Brucellosis
1027	3	Leptospirosis-Weils's Disease
1357	4	Erysipeloid
1372	5	Ornithosis (Psittacosis, Parrot Fever)
982	6	Gas Gangrene
1049	7	Tetanus - "Lockjaw"
1151	8	Poison Ivy Dermatitis
1224	9	Cutting Oil Dermatitis
1244	10	Personal Hygiene in Handling Epoxy Resins
		Mineral Data Sheets
1222	1	Silica
1352	2	Asbestos
1290	3	Mica
1321	4	Pumice
1324	5	Talc
1322	6	Granite
1304	7	Silicon Carbide
1320	8	Aluminum Oxide
1327	9	Fibrous Glass
		Physical Data Sheets
1260	1	X-Rays
1294	2	Ultraviolet Radiation
1277	3	Infrared Radiation
1138	5	Noise
1207	6	Excessive Heat
1276	7	Increased Pressure
1075	9	Dampness
1269	12	Cobalt-60
1306	13	Strontium-90
1288	14	Tritium
1264	15	Krypton-85
1273	16	Iridium-192
1281	17	Thorium
1297	18	Radium
1275	19	Leak Testing of Sealed Radioactive Sources
1284	20	Microwaves

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Respiratory Protection Data Sheets
1189	1	Self-Contained Breathing Masks
1223	2	Acid Gas Masks
998	3	Organic Vapor Masks
999	4	Acid Gases and Organic Vapors
942	5	Ammonia Gas Masks
1198	6	Carbon Monoxide Gas Masks
945	7	Universal Gas Masks
958	8	Hose Masks--Type A
959	9	Hose Masks--Type B
969	10	Air-Line Respirators
960	11	Blasting Helmets
936	13	Dispersoid Respirators Toxic Dusts
1157	17	Chemical Cartridge Respirators--Organic Vapors
1176	18	Chemical Cartridge Respirators--Acid Gases
1177	19	Chemical Cartridge Respirators--Acid Gases and Organic Vapors
1173	20	Chemical Cartridge Respirators--Ammonia
997	21	Chemical Cartridge Respirators--Mercury Vapor
1206	22	Massachusetts Sales Representatives of Manufacturers of Respiratory Protective Equipment
947	23	Chemical Cartridge Respirators--Dispersoids and Organic Vapors
1230	24	Dispersoid Respirators--Highly Toxic Dusts
1215	25	Respiratory Protective Devices
1178	26	Chemical Cartridge Respirators--Pesticides
1188	27	Chemical Cartridge Respirators--Paints, Lacquers, Enamels
1211	28	Dispersoid Respirators--Asbestos
1213	29	Dispersoid Respirators--Dusts, Fumes, Mists and Fibers
1214	30	Dispersoid Respirators--Pneumoconiosis and Fibrosis Producing Dusts and Mists
1248	31	Respirators Care and Maintenance Program

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Ventilation Data Sheets
1122	1	Planers
1094	2	Plating Tanks
1147	3	Spray Booths
1012	4	Portable Grinders
1259	5	Open Tanks
1107	6	Swing Frame Grinders
1209	7	Blasting Rooms
1315	8	Granite Blasting Rooms
1102	9	Tumblers--Hollow Trunnion Type
1053	10	Foundry Shakeout
1174	11	Weather Caps
1041	12	Soldering Bench
1196	13	Disc Grinder--Horizontal Single Spindle Type
1028	14	Disc Grinder--Vertical Spindle Type
1039	15	Grinding and Polishing Belt
1353	16	Portable Bench Grinder
1104	17	Bucket Elevator
1096	18	Melting Furnace, "Tilting"
1197	19	Pouring Station
1072	20	Make-Up Air
1258	21	Laboratory Hood
1318	22	Spray Painting Rooms
		Nursing Data Sheets
1117	1	Plant Shuttle Service
1358	2	Information Concerning Pregnant Employees
1346	3	Eye Safety Program
1356	4	Epilepsy
1293	5	Emergency Medical Transportation
1355	6	Recommended First Aid Supplies
1241	7	First Aid Log
1202	8	Hearing Conservation
1145	9	Heimlich Method of Resuscitation
1154	10	Occupation/Work History
1246	11	Color Coding
1345	12	Massachusetts Poison Control System
1365	13	Services Available for Health and Educational Material
1205	14	Guidelines for Informing Employees of Medical and/or Laboratory Findings
1226	15	First Aid Monthly Summary

REPRINTS OF WRITINGS OF THE STAFF

Bull. No.	
1025	Mercury Contamination in the Dental Office. Journal of the Massachusetts Dental Society, Fall 1971, 8 pp.
1078	Concentration Adjustments in Urinalysis. American Industrial Hygiene Association Journal, September 1974, 7 pp.
1098	Mercury and the Hazards of Vacuum Cleaning. The New England Journal of Medicine, February 13, 1975, 1 p.
1274	Physical Assessments of the Oral Cavity. Occupational Health and Safety, July/August 1979, 2 pp.
1307	Asbestos Exposures in Massachusetts Public Schools. American Industrial Hygiene Journal, April 1980, 7 pp.
1336	The Occupational and Environmental Health History. Journal of American Medical Association, December 18, 1981, 6 pp.
1339	Exposure to Lead from the Mystic River Bridge: The Dilemma of Deleading. New England Journal of Medicine, March 18, 1982, 4 pp.
1343	Accelerated Loss of FEV-1 in Polyurethane Production Workers: A Four-Year Prospective Study. American Journal of Industrial Medicine 3:209-215 (1982).

MISCELLANEOUS BULLETINS

Bulletin No.	
169	Ventilation Degreasing Tank. January 1961. 1 p.
617	Standard Hoods for Grinding, Buffing, and Polishing. March 1952. 2 pp.
866	Study of Timed Urine Samples. June 1964. 2 pp.
908	The Safe Operation of Vapor Degreasers. February 1967. 3 pp.
921	Ventilation Requirements for Control of Fumes from Electrical Arc Welding and Cutting. January 1968. 4 pp.
968	Control of Carbon Monoxide Gas in Automobile Garages. January 1970. 3 pp.
971	Manhole Accidents. September 24, 1969. 1 p.
972	Health Hazards in the Metal Can Industry. February 1968. 3 pp.
984	Industrial Vacuum Cleaning. May 1970. 2 pp.
987	Inert Gas-Shielded Arc Welding. June 1970. 2 pp.
1067	Vinyl Chloride Investigation. May 1974. 1 p.
1143	Medical Examination of Personnel Exposed to Ionizing Radiation. September 1976. 2 pp.
1232	Guidelines for Office Buildings with Asbestos Fireproofing. January 1981. 2 pp.
1256	Role of the Occupational Health Nurse. May 1979. 2 pp.
1257	Role of the Occupatioanl Health Physician. May 1979. 1 p.
1266	Economic Value of Health Service Department. June 1979. 2 pp.
1270	Mercury Resource Information. September 1979. 1 p.
1271	The Occupational Health Unit. November 1979. 2 pp.
1296	Reference Library. November 1980. 1 p.
1299	Industrial Hygiene Services. April 1980. 1 p.
1319	Organic Phosphate Insecticides, Medical Control Procedures. June 1981. 3 pp.
1331	Amended OSHA Noise Standard from Federal Register 8-25-81. September 1981. 1 p.
1333	Recommendations for Dental Offices. January 1981.
1337	Tank Painting Hazards. August 1981. 1 p.
1338	History of Massachusetts Asbestos Commission. November 1980. 1 p.
1341	Significance of Urinary Mercury Concentration in Light of Change in MAC (TLV) for Mercury Vapor.
1344	Reprints of Writings of the Staff. December 1982. 3 pp.
1364	Protocol for Investigation Bad Air Complaints. May 1985. 1 p.
1378	Occupational Health Programs. March 1986. 4 pp.
1379	Standard Operating Procedure for Removing Lead-Based Paint. April 1978. 2 pp.
1391	Recommended Safe Practice Bulletins Currently Available for Distribution. June 1986. 2 pp.

MISCELLANEOUS BULLETINS

Bulletin No.	
1359	Safe Repair Practices of Asbestos Pipe and Boiler Coverings. March 1983. 2 p.
1362	"Right to Know" Compliance Assistance Package. August 1984. 11 pp.
1373	Suggested Bid Specifications for Contractual Asbestos Related Work. January 1986. 6 pp.
1377	Compliance Assistance Program for the Massachusetts Right to Know Law. April 1986. 4 pp.
1381	Glove Bag Removal Technique. 1 p.
1382	Glove Bag Emergency Procedures. 1 p.
1383	Full and Half-Face Respirator Fit Test. 4 pp.
1384	Pertinent Addresses and Telephone Numbers. 1 p.
1385	Consultation Program for the Massachusetts Right to Know Law. 4 pp.
1390	Minimum Specifications for Asbestos Abatement Projects Eligible for Reimbursement Under -- Chapter 614 of the Acts of 1985. 7 pp.
1397	Asbestos Brake Lining Fact Sheet. 4 pp.

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PREVENTION

DETECTION EVALUATION

CONTROL

Annual Report 1987

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James F. Snow, *Commissioner*

DIVISION OF OCCUPATIONAL HYGIENE
Richard Levine, *Director*

Originating Office

Department of Labor and Industries, Division of Occupational Hygiene

1001 Watertown Street, West Newton, Massachusetts 02165

1987 Annual Report of the Division of Occupational Hygiene

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ANNUAL REPORT OF THE

DIVISION OF OCCUPATIONAL HYGIENE

FISCAL 1987

This annual report records the programs and activities of the Division of Occupational Hygiene in the Department of Labor and Industries for the fiscal year beginning July 1, 1986.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter Three Hundred Thirty-one of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES".

Section Eleven A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Richard Levine, B.S., Director
Patricia Circone, B.S., Chief of Laboratory
Rose H. Goldman, M.D., Occupational Health Physician
Rexford Alexander, M.S., C.I.H., Senior Industrial Hygiene Engineer
Leonard D. Pagnotto, M.S., C.I.H., Associate Sanitary Engineer
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor
Virginia M. Summers, R.N., M.S., Health Care Facility Inspector
Joel P. Weddig, B.S., C.I.H., Senior Industrial Sanitary Engineer
Janice LaMalva Pacenka, M.A., Senior Industrial Sanitary Engineer
Elise Pechter Morse, M.S., Senior Chemist
Mark Malchik, M.S., Senior Industrial Hygiene Engineer
Thomas Cronin, M.S., Assistant Industrial Hygiene Engineer
Philip Korman, M.P.H., Assistant Industrial Hygiene Engineer
Joan Parker, M.S., Assistant Industrial Hygiene Engineer
Nga Tran, M.S., Assistant Industrial Hygiene Engineer
Karla Kelley, B.S., Assistant Industrial Hygiene Engineer
Frank M. Kramarz, B.S., Senior Industrial Sanitary Engineer
Ernest Kelley, M.S., Assistant Industrial Hygiene Engineer
Mitchell Campbell, B.S., Assistant Industrial Hygiene Engineer
Nancy McCormack, B.S., Assistant Industrial Hygiene Engineer
Julie Jones, B.S., Assistant Industrial Hygiene Engineer
Kathleen Estridge, M.S., Assistant Industrial Hygiene Engineer
Gerard Porter, B.S., Assistant Industrial Hygiene Engineer
Cathleen Donohue, B.S., Assistant Industrial Hygiene Engineer
Robert H. Kenrick, B.S., Senior Chemist

Michael Kissel, B.S., Assistant Chemist
Erwin Allen, B.S., Chief of Engineering Services
Joseph LaMalva, M.S. Senior Chemist
Patti Pendexter, B.S., Senior Chemist
Kathryn Swanson, B.S., Assistant Industrial Hygiene Engineer
Kathleen Harvey, M.P.H., Assistant Industrial Hygiene Engineer
Bernice Linde, B.S., Administrative Assistant
Sylvia Golub, Head Clerk
Cheryl Johnston, Senior Library Assistant
Rea Fulkerson, EDP Entry Operator II
Mary Lim, RTK Head Clerk

PERSONNEL CHANGES - FISCAL 1987

Ms. Patricia Circone was promoted to Assistant Director of the Division of Occupational Hygiene and Mr. Robert Kenrick was promoted from a Senior Chemist position to the Chief of Laboratory on July 6, 1986.

Ms. Patti Pendexter resigned from a Senior Chemist position in the 7-C-1 Consultation Program on July 23, 1986.

Ms. Rea Fulkerson resigned from the position of EDP Operator II on July 24, 1986.

Lewis Pepper, M.D. joined the Division as a part time Occupational Health Physician on July 28, 1986.

Mr. Gerard Porter transferred laterally from the Asbestos Program to the State Side Program on July 27, 1986. The vacancy of an Assistant Industrial Hygiene Engineer in the Asbestos Program was filled by Mr. Arthur Pennesi B.S. on the same date.

Mr. Mark Malchik resigned on August 23, 1986 as Senior Industrial Hygiene Engineer in the RTK Program. Mr. Philip Korman was promoted to Senior Industrial Hygiene Engineer to fill this vacancy.

Mr. Mitchell Campbell made a lateral transfer to the RTK Program from the Asbestos Program as an Assistant Industrial Hygiene Engineer on September 7, 1986. Ms. Joan Breitung B.S. joined the staff to fill the vacancy in the Asbestos Program on the same date.

Following forty-seven years of service with the Division, Ms. Bernice Linde retired as Administrative Assistant on September 30, 1986.

On October 3, 1986 Ms. Nga Tran resigned as an Assistant Industrial Hygiene Engineer in the RTK Program.

Ms. Sylvia Golub was promoted from Head Clerk to Administrative Assistant on October 5, 1986.

Ms. Shere Thomas joined the staff as an EDP Operator II on October 10, 1986.

Ms. Janice LaMalva Pacenka resigned from the State Side Program as Senior Industrial Sanitary Engineer on October 25, 1986.

Mr. Thomas Cronin resigned as an Assistant Industrial Hygiene Engineer from the RTK Program on October 25, 1986.

Ms. Elise Morse was promoted from Senior Chemist to Senior Industrial Sanitary Engineer on November 2, 1986. Gerard Porter was promoted to the Senior Chemist position on the same date. Mitchell Campbell was promoted from RTK Program as an Assistant Industrial Hygiene Engineer on this date to the Senior Chemist position on State Side. Mr. Michael Kissel was promoted from Assistant Chemist to an Assistant Industrial Hygiene Engineer.

On November 2, 1986 Mr. Richard Rabin M.S. joined the RTK Program as an Assistant Industrial Hygiene Engineer. The second vacancy in this Program was filled by Ms. Maxine Garbo M.S.R.N. on November 9, 1986 as an Assistant Industrial Hygiene Engineer.

Ms. Cheryl Johnston was promoted to Clerk III on November 16, 1986 and then to Clerk IV on December 7, 1986.

Mr. Salvatore Insogna M.S. joined the RTK program on November 30, 1986 as Assistant Industrial Hygiene Engineer.

Mr. Moe Wasserman Ph.D. joined the staff on January 11, 1987 on a part time basis as an Engineer V.

Ms. Parveen Sheikh joined the staff as a Clerk III on January 20, 1987 and resigned from the position on June 20, 1987.

Ms. Nina Inchardi M.S. joined the Asbestos Program on February 1, 1987 as an Environmental Engineer II.

Mr. Lawrence R. Adams Ph.D. joined the Radiation Program as Chemist II on February 22, 1987.

Ms. Kathleen Harvey resigned from the 7-C-1 Consultation Program on February 28, 1987 as an Environmental Engineer II.

Ms. Nancy Comeau transferred from the Asbestos Program to the 7-C-1 Consultation Program as an Environmental Engineer II on March 1, 1987.

Ms. Karla Kelley transferred from the RTK Program to the 7-C-1 Consultation program on March 22, 1987 as an Environmental Engineer II.

Mr. Richard Rabin was promoted on March 22, 1987 from an Environmental Engineer II to an Environmental Engineer III in the Right to Know Program.

Mr. Thomas Trayers M.S. joined the staff as an Environmental Engineer II on RTK program on April 26, 1987.

On November 30, 1986 several reallocations took place in the Division:

In the State-Side Program, the two Senior Chemist positions were reallocated to Senior Industrial Sanitary Engineers and a Junior Chemist to a Principal Environmental Engineer.

In the Asbestos Program, the Senior Industrial Sanitary position was reallocated to a Principal Environmental Engineer and three Assistant Industrial Hygiene Engineers were reallocated to Senior Industrial Sanitary Engineers.

In the RTK Program, the Senior Industrial Sanitary Engineer was reallocated to a Principal Environmental Engineer and two Assistant Industrial Hygiene Engineers were reallocated to Senior Industrial Sanitary Engineers.

In the 7-C-1 Consultation Program, on December 28, 1986, two Senior Chemists were reallocated to Senior Industrial Sanitary Engineers.

Under a new reclassification plan which went into effect on December 28, 1986 several titles were changed. They are as follows:

Assistant Chemist	Chemist II
Chief of Laboratory	Laboratory Supervisor II
Assistant Industrial Hygiene Engineer	Environmental Engineer II
Senior Industrial Sanitary Engineer	Environmental Engineer III
Radiation Scientist	Environmental Engineer III
Industrial Radiation Control Supervisor	Environmental Engineer III
Principal Environmental Engineer	Environmental Engineer IV
Associate Environmental Engineer	Environmental Engineer V

GENERAL ACTIVITIES

The Division of Occupational Hygiene consists of four sections, the State Side Program, the Asbestos Program, and the engineering sections of the 7(C)1 Consultation Program and Right to Know Program.

The Division offices and laboratory are located in rented quarters on the second floor at 1001 Watertown Street, West Newton, MA. Sixty-two hundred (6,200) square feet of space is occupied by the Division at this location.

The Division of Occupational Hygiene provides solutions to industrial hygiene problems in the workplace by detection, evaluation, and control of existing and potential health hazards resulting from occupational exposure.

Many problems are taken care of through solutions offered by telephone communications. Others are resolved with the dissemination of bulletins and other written communications. The third means of solving problems is with site visits and training provided by members of the Division.

During FY 1987 in addition to handling hundreds of phone calls, 1541 requests for information were handled by the Division personnel. A total of 1598 site visits were made to evaluate potential health hazards, to provide health and safety presentations or provide training.

During site visits, a total of 18,037 evaluations or measurements by direct reading instrumentation were made. Samples collected for laboratory analysis in addition to asbestos during these visits totalled 1622. Of these 1200 were analyzed in the Division's laboratory and 422 were sent to the Wisconsin OSHA laboratory for analysis. The Division's laboratory also performed 2080 blood leads and 1940 zinc protoporphyrins on samples received by mail as well as 944 urine mercuries.

The Division participated in the NIOSH Proficiency Analytical Testing Program which includes analysis of simulated known samples for asbestos, lead cadmium, zinc and organic solvents. The Division also participated in the Research Triangle Institute program for bulk analysis of asbestos. The laboratory participated in the blood lead testing program offered by West Allis Memorial Hospital and the College of American Pathologists. Participation in the latter is required to remain on the OSHA approved laboratory list for blood lead testing.

A total of 5,855 recommendations were made by the Division. At the end of the year a form was adopted to track the completion of these on the State Side Program. These numbers will be tabulated beginning in FY 88.

All programs have received numerous letters of commendation for their work.

7(C)1 ON-SITE CONSULTATION PROGRAM

The Massachusetts Department of Labor and Industries continued the 7(C)1 On-Site Consultation Program sponsored by the U.S. Department of Labor (DOL), Occupational Safety and Health Administration (OSHA). The 7(C)1 unit in the Division of Occupational Hygiene (D.O.H.) responds to requests from management. The highly trained consultants provide management with on-site testing, observations, and advice to achieve and to maintain a safe and healthful workplace. Management is shown how to interpret and come into compliance with the occupational health regulations so that the employee is protected.

The program is now in its thirteenth year of providing assistance at no cost to Massachusetts businesses. This past year 255 consultations were accomplished with many producing significant changes in the workplace atmosphere. OSHA has charged the Consultation Program with establishing a system of prioritization of employer requests from small, high hazard businesses; small business; larger high hazard business; and lastly, large, non-high hazard business. This system of priorities has been established this past year and will continue to be emphasized in the current year.

STATE-SIDE PROGRAM

Engineers from this section of the Division made a total of 392 site visits which resulted in making 3,300 recommendations to improve the health and safety conditions for employees. This program differs from the 7(C)1 Consultation Program mainly regarding the source of requests for help. It responds to employees, labor unions, city, municipal and state management, health professionals, etc., whereas the consultation program responds to employers only.

Many problems are solved without site visits being made. Information and advice is provided by telephone which often alleviates the need for a site visit.

Dissemination of 893 informational requests originated from this section of the Division.

RIGHT-TO-KNOW PROGRAM

The Right to Know (RTK) Program matured in FY 1987 into a program that successfully provided three major services. The services were: technical assistance to employers through the Right To Know Consultation Program, the compilation of Material Safety Data Sheets (MSDSs) and the development and design of new educational materials. The RTK Program continued to play a vital role in the formulation of RTK policy for the Department, publication of the newsletter, Health and Safety on the Job, coordination of the monthly occupational health seminars and the acquisition of technical resources. These services are more fully described below.

RTK Consultation Program

The RTK Consultation Program has been very successful in attracting clients in both the public and non-manufacturing private sectors, and conducted 157 visits to these workplaces. These sectors were given a higher priority since the federal RTK standard did not apply to them. During the past year, over sixty employers received services that helped them with product inventories, container labeling, employee training etc. The size of these facilities varied dramatically from a high of 2000 employees in a private hospital to a low of six employees in an auto body shop. Twenty cities and towns participated in the program (one-third of the clients) indicating a strong need for services due to limited resources.

As a result of some clients not following the consultant's recommendations on compliance with the Massachusetts RTK Law, an explicit procedure was implemented. All clients must sign a timeline which indicates by what date right to know tasks must be completed. If the client does not meet the deadlines, the consultation may be terminated and the file referred to the Division of Industrial Safety and the Department of Environmental Quality Engineering for enforcement action. As a result of these procedures, six clients were referred for possible enforcement action.

Educational Materials

Over the past year, three very useful educational tools were developed; the Right to Know (RTK) Employer Assistance Manual, and a booklet and pamphlet on employee rights. The RTK Employer Assistance Manual was used by both clients in the Consultation Program and other employers (who were able to purchase it through the State House Book Store). It is written in lay-language and is geared to municipal officials and small business owners. More than six hundred Massachusetts employers have used it in their efforts to comply with the Massachusetts RTK Law.

The employee rights booklet, "Chemical Hazards on the Job - Your Right to Know", was completed at the end of the year and is geared for use by employers, unions and individual employees. Copies will be available through the State House Bookstore and additional copies can be made and distributed by any individual, union or employer. The pamphlet was distributed to all public sector unions in Massachusetts and two unions sent copies to all of their members, while others excerpted it for use in their union newsletter.

Compilation of Material Safety Data Sheets (MSDSs)

During the past year the compilation of substitute MSDSs for six substances listed on the Massachusetts Substance List was completed. These were methane, ozone, cadmium, nickel, copper and carbon monoxide. MSDSs for inorganic lead dust and fumes, iron oxide fumes, aluminum, antimony, magnesium, beryllium, tin and kerosene are in various stages of completion.

RTK Policy Development

The RTK Staff has continued to play an active role in the formulation of RTK policy for both the Department and the RTK Interagency Task Force. The following policies have been completed: structural and non-structural asbestos, the coverage of volunteers and MSDS recordkeeping requirements. In addition, RTK staff members have participated in the formulation of the proposed regulation for deleading operations to ensure consistency with the training requirements under the Massachusetts RTK Law.

Health and Safety on the Job: Common Health in the Commonwealth

The newsletter has established itself as an important resource for those interested in job safety and health, Right to Know and the activities of the Department. The writing, editing, lay out and mailing list are shared by the RTK Program and the Division of Industrial Safety. Four issues were completed in the past year. One issue was entirely devoted to RTK activities including the RTK policy on asbestos in buildings. The mailing list of 2,000 continues to grow as over three hundred requests for the newsletter were received from businesses, unions and health professionals.

Monthly Occupational Health Seminars

A member of the RTK Program continued to coordinate the monthly seminars which have been attended by over one hundred professionals from many different settings such as businesses, hospitals, and universities as well as local, state and federal agencies.

Acquisition of Technical Resources

RTK members have been involved in expansion of the technical resources of the Division with the addition of a reproductive toxicology data base, and in setting up a video tape library.

ASBESTOS PROGRAM

The D.O.H. Asbestos Program's original mandate was to inspect public schools and other public buildings (state, county, and municipal) for asbestos. In this fiscal year, 529 such inspections were performed by the Asbestos Program. Initial asbestos inspections on all public schools in the Commonwealth were completed and 160 review asbestos inspections were conducted in the public schools and other public buildings. The majority of the 8,000 to 10,000 public buildings in the Commonwealth (exclusive of public schools) have received initial inspection, whereas 20% of the municipal buildings have been completed.

Currently, the Asbestos Program is providing a much broader range of technical and administrative services than was originally mandated. These new services are being provided without additional staffing. Responsibilities include:

The collection and analysis of asbestos bulk and air samples;

The processing of applications for the school asbestos abatement reimbursement program (Chapter 614);

The presentation of asbestos training programs for state employees who may come in contact with asbestos and;

The dissemination of technical information related to asbestos.

The development of new systems for internal record keeping and other duties related to the development and implementation of Department of Labor and Industries Regulations for the Removal Containment or Encapsulation of Asbestos, 453 CMR 6.00. The particulars of each of these additional duties are summarized below:

Sample Analysis

In addition to analyzing asbestos bulk and air samples collected during asbestos surveys the Asbestos Program accepts samples for analysis from union representatives, local boards of health, DIS inspectors, State Side and the 7C1 OSHA programs. In Fiscal Year 1987, the Asbestos Program analyzed 1603 asbestos bulk samples and 112 asbestos air samples. One hundred seventy-four of the bulk samples contained asbestos.

Chapter 614, Commonwealth Asbestos Abatement Reimbursement Program for Schools

In December 1985, the Massachusetts Legislature passed an Act (Chapter 614, M.G.L.) which authorized the Massachusetts Board of Education to expend a sum of up to twenty-five million dollars for removal, encapsulation or containment of asbestos in public school buildings, and five million dollars for abatement in private schools.

All technical aspects of the program including approval of the abatement solution, review of bid specifications and final review of project completion are handled by the D.O.H. while the financial aspects of the program are handled by the School Building Assistance Bureau of the Department of Education.

In Fiscal 1986 the Division developed several form letters and protocols and developed a specialized filing system to track all phases of the program. The work involved in this project (approximately 48 hours per week) is shared by three members of the Asbestos Program.

The following chart will depict the activities of both the public and private schools since the program went on line in July of 1986. Note that the public school reimbursement activity started in July and the private school reimbursement actually was not initiated until January 1987.

Activity	Public Schools	Private Schools
Number of letters sent out	268	110
Number of applications sent out	824	73
Number of applications returned	146	18
Number of applications approved	132	18
Approximate funds allocated	$5.5 million	$530,000
Number of phone calls	335	226

Asbestos Training Program for Commonwealth Employees

Following promulgation of the Environmental Protection Agency's (EPA) Worker Protection Rule (WPR), reference Federal Register April 25, 1986 (amended April 30 1987), and in response to the recommendations of the Commonwealth's Asbestos Task Force, reference Governor's Budget Recommendations for Fiscal Year 1987, the Asbestos Program has developed an Asbestos Training Program for State employees who may come in contact with asbestos.

A 200-page Asbestos Policy and Procedure Manual to be used as a guide for the Asbestos Training Program was developed by the Asbestos Program. The writing of this manual involved two months of full-time work for two engineers in the Program during the beginning of the Fiscal year.

Management sessions are conducted prior to training to explain the requirements of the WPR, the components of the training program and fiscal matters concerning asbestos abatement to state facility administrators.

Currently, thirty-four facilities have completed initial training. D.O.H. is presently conducting eight training sessions per month. There are approximately 130 facilities yet to receive initial training. The one-day training sessions are jointly presented by two engineers.

Dissemination of Technical Information Related to Asbestos

The Asbestos Program has experienced an increased demand for technical information related to asbestos. In Fiscal Year 1987, the Asbestos Program was responsible for 420 pieces of information to a diverse field of inquirers.

453 CMR 6.00

The Department of Labor and Industries received a USEPA grant in August. Several members of this Division spent extensive time with representatives of the Division of Industrial Safety working the drafting of 453 CMR 6.00 The Removal, Containment or Encapsulation of Asbestos.

Asbestos Hazard Emergency Response Act (AHERA)

On May 20, 1987 the Asbestos Program Supervisor attended a meeting on EPA's proposed Asbestos Hazard Emergency Response Act. Amongst the proposed regulations was the development of asbestos management plans by local education agencies. It is expected that the Governor will designate the Asbestos Program of the Division as the state agency to receive and evaluate these plans within 90 days after submittal. From past experience with the reimbursement program it is anticipated that the majority of plans will be submitted near the deadline. Without additional resources, it will be very difficult to fulfill this obligation.

NURSING ACTIVITIES

Plant visits were made to manufacturing, non-manufacturing plants and hospitals with different levels of occupational health programs at each setting.

Visits were self-initiated or at the request of management and/or the nursing staff. Primarily, requests were for information on the employment of a registered nurse and establishment of an occupational health program or assisting newly employed occupational health nurses with the development of a health program.

Telephone requests for information relating to health and safety factors were also received and responded to or referred as appropriate.

A number of visits were made to one computer business as a result of an outbreak of conjunctivitis among a large number of employees. The Department of Public Health was requested to assist the Division of Occupational Hygiene with the investigation. The work process included the use of microscopes and these were believed to be a causative factor in spreading the condition. Cultures were taken from the affected employees by the opthalmologists and from common areas including the ventilation system by the Department of Public Health staff. Little or no bacteria was identified from the eye cultures and it was therefore believed that the cause of the infection was viral in nature. No virus was identified from the cultures taken in the common areas.

Policies and procedures were adopted by the company to ensure good personal hygiene among the employees using the microscopes to avoid any further spread as well as thorough and frequent cleanings of the common work areas and plant services. The outbreak lasted approximately three months. The use of safety glasses or personal glasses was required for all employees and visitors to the plant.

The Video Display Terminal study that was completed in July, 1986 was released to the public and approximately 300 requests of the report and/or summary of the findings were received from employers, unions, and employees in different settings.

A revision of MGL Chapter 149, Section 141: "Requirements for the care of employees injured or taken ill in industrial establishments", was submitted to the legislature in November, 1986 to provide more current and appropriate requirements for industry. As no action was taken by the Legislature on the Bill, it will be re-submitted in November, 1987.

Approximately thirty-five meetings/seminars were attended. The meetings were specific to occupational health and safety. A one-day seminar on health promotion was attended by the Division nurse, and three other staff members. A health promotion program was then developed for the employees at the Division of Occupational Hygiene by the occupational health nurse and centered primarily on nutrition and the importance of regular exercise. A cholesterol screening was also offered to all employees.

MEDICAL PROGRAM

Another occupational medicine physician joined the D.O.H. staff to share the part-time occupational health physician position. Having two physicians on staff has allowed the medical program to expand its activities and to enter new areas of program development.

One of the most important activities of the occupational medicine physicians is to accompany industrial hygienists on worksite evaluations needing input on health/medical related issues. The D.O.H. physicians, or medical residents under their supervision, were involved in 20 work site evaluations this year. Some examples of these health hazard evaluations included:

(1) Assessment of the medical effects of hydrated lime at an incinerator. Recommendations were provided concerning protective measures to avoid contact as well as emergency measures in case of contact.

(2) Assessment of skin problems related to contact with cutting oils. Information was provided concerning ways to avoid exposures, and recommendations given for appropriate soaps and barrier creams.

(3) Assistance in determining the cause of headaches and eye irritation and other health complaints in several companies doing photocopying and diazoprinting.

(4) A survey of health complaints reported by 12 employees working at a company packaging pharmaceutical agents was performed in response to an employee/physician complaint. Although the survey did not demonstrate a clearcut relationship between prevalence of symptoms and workplace exposures, observation and evaluation of the work process revealed excessive exposure to the fluorocarbon propellant. The employer was educated about potential cardiac effects of fluorocarbon and recommendations were given to avoid exposure.

(5) Investigation of medical complaints at a printing company revealed potential problems with noise and various solvent exposures. Information was given concerning health effects and recommendations offered concerning changes in work process and protective measures.

(6) Investigation of medical complaints at a sewage treatment plant led to recommendations concerning the need for improved ventilation, as well as information given concerning medical surveillance and first aid.

(7) Evaluation of areas in a rubber company led to information and recommendations related to exposures to toluene, noise, dimethyl formanide (DMF), Diphenylmethane diisocyanate (MDI), accelerators, antidegradants, retarder, and other solvents. Recommendations for a comprehensive medical surveillance program were also outlined.

The occupational health physicians have played an active role in the Massachusetts Interagency Task Force on Occupational Illness and Injury Surveillance and Intervention. This task force, with representatives from the Department of Public Health, Department of Industrial Accidents, Department of Environmental Quality Engineering (DEQE), Executive Office of Labor and the Department of Labor and Industries has been examining various sources of occupational health data in the state. The purpose of this task force, which is funded through a DPH cooperative agreement with the National Institute of Occupational Safety and Health (NIOSH) is to define mechanisms for occupational illness and injury surveillance and intervention in the state of Massachusetts.

The medical program has continued to cooperate with the Massachusetts Childhood Lead Program to provide follow-up for workers who develop lead poisoning as a result of deleading. Several workers were identified with lead poisoning, two to a severe degree, and D.O.H. physicians facilitated the appropriate evaluation and treatment of these employees. The physicians have also been involved with a new legislative initiative concerning deleading as it pertains to protection of the workers.

Calls to the Massachusetts Poison Center concerning occupational exposures have been followed by the medical program. A more formalized proposal to develop a model system linking the Poison Center with an occupational health clinic and D.O.H. was submitted to the Interagency Task Force as a possible project for the coming year.

The occupational health physicians have spoken at the monthly Occupational Health Seminars offered by D.O.H. on the following topics: Occupational Immunotoxicity, Drug Testing in the Workplace, Environmental Lung Disease, Electroplating and Cyanide Exposure, Dry Cleaning and Laundry Workers. D.O.H. physicians have also given lectures on Recognizing Occupational Health Problems to community hospitals and health centers. One D.O.H. physician was a panelist at the conference on: Women at Risk at the Workplace.

We continue to assist in educating physicians about occupational health problems by supervising the rotation of Medical residents and Occupational Health residents from Harvard University through D.O.H. The residents participate in worksite evaluations and other projects.

The D.O.H. physicians also participated in the Division's assessment of a study of adverse reproductive outcome performed by a microelectronics company.

RADIATION CONTROL PROGRAM

The Division continues to have the responsibility for receiving and maintaining registrations for lasers and sources of ionizing radiation used in industry. A program of compliance evaluation is in place for ionizing radiation, but not for lasers. Since 1985, notifications have been required under 440 CMR 5.00 for radio frequency installations and other sources of nonionizing radiation.

Effort commenced in fiscal year 1986 towards education and dissemination of information about 440 CMR 5.00 continued into fiscal year 1987. A seminar organized in conjunction with DPH scientific staff held at D.O.H. was attended by statewide representatives of the broadcasting industry. In addition, an article authored by the Radiation Scientist describing the new regulations, entitled Occupational Exposures to Nonionizing Radiation, was published in the newsletter of the Massachusetts Broadcasters Association.

A deferment until spring, 1987, was granted for notifications from the broadcasting industry to allow for proper conduct of the surveys required by the new legislation. A program of compliance evaluation for nonionizing radiation is in development. As is the case for lasers and ionizing radiation, medical and educational applications of nonionizing radiation (NIR) are regulated by the Department of Public Health (DPH).

The staff was increased temporarily to two individuals commencing in February, 1987. Personnel requirements for initiation of the NIR program relaxed as notifications were received and processed. NIR compliance evaluation activities in fiscal year 1987 consisted of eighteen field visits, numerous telephone consultations, and commencement of statistical evaluation of notification data.

Ionizing-radiation compliance evaluation effort increased. One hundred forty field compliance inspections were conducted. Established policy of negotiating recommended program modifications with registrants continued and no enforcement action was required. One hundred forty-three recommendations were made.

A reactive NIR inspection was performed as the result of allegations from the propietor of a business using microprocessor control that radio-frequency radiation from a nearby business disrupted his microprocessors. DPH scientific staff participated in the inspection. A registration for radio-frequency heat sealing equipment, and a commitment to improve shielding for personnel protection, were obtained.

Seven surveys of video display terminals were performed. For the most part such surveys are routine as called for by union contract in state offices, but some follow reports of illnesses or illness clusters. No instances were found of VDT emissions of amounts of ionizing or nonionizing radiation above permissible limits.

Fifty-five new registrations of companies having sources of ionizing radiation were recorded during the fiscal year. The registration file was updated, modified, and culled as required for such sources of ionizing radiation as particle accelerators, gauges, and x-ray machines of various types, e.g., diffraction, spectrographic, fluoroscopic, and radiographic. Various categories of sealed and unsealed radioactive materials also require registration. It is estimated that over five thousand radiation sources in use in Massachusetts industry are currently registered.

NOTEWORTHY INVESTIGATIONS AND ACTIVITIES

Excessive Lead Exposure at Police Firing Range

The Division of Occupational Hygiene received a request from the Division of Industrial Safety and a Town Police Department to investigate potential health hazards within the Police Department's firing range. The range contained four firing booths with officers normally firing 50 rounds of .38 caliber 158 grain lead bullets.

The existing ventilation system in the firing range did not adequately control lead dust and fumes. Airborne lead levels reached and exceeded the current Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 0.05 mg/M^3.

Recommendations to decrease the town's police officers exposure to lead included guidelines for redesigning the ventilation system, protocol for limited firing activity, and proper procedures for cleaning the firing range.

Exposure to Carbon Monoxide

Department of Public Works employees were concerned about carbon monoxide exposure while doing routine maintenance work in a well-traveled vehicular tunnel. Readings of carbon monoxide were collected in four locations in the tunnel over a twenty-four hour period using passive dosimeters. The information stored in the dosimeters was transferred to a computer, printed out and the results were analyzed. Carbon monoxide levels were found to be between 20 and 170 ppm with an average of 70, for typical commuting hours. The NIOSH eight hour TWA for carbon monoxide is 35 ppm. It was recommended by this Division that the DPW repair the defective exhaust fans in the tunnel or use the appropriate respiratory protection when working in the tunnel.

Improperly Operation of Exhaust Hood in High School Classroom

Teachers and students in a public high school reported symptoms during biology lab which included nose and eye irritation, dizziness, and lethargy. An inspection of the classroom revealed that a large exhaust hood was inadequately exhausting air compared to other similar hoods in the school, where no health problems were reported. Although no samples were collected, it was believed that formaldehyde, used as specimen preservative, was responsible for the reported symptoms.

The Division made engineering recommendations to a ventilation engineer contracted by the school and the problem was corrected.

Survey of Wastewater Treatment Plant

A request was received from a major city in western Massachusetts for an industrial hygiene survey of their treatment plant and several pumping stations. Environmental measurements were made for hydrogen sulfide, methane, oxygen, chlorine, phosgene, and formaldehyde. Exposures were within acceptable limits. Ventilation measurements were made in plant areas and in the laboratory. Recommendations were made concerning venting of confined spaces, confined space entry, emergency procedures and equipment, improved ventilation utilization, and control of odors.

Noise Survey at Window and Door Manufacturer

An investigation was conducted of a company which assembles aluminum storm windows and doors. This agency had been contacted by another state agency following an occupational illness referral. Sound levels were measured and found to be excessive. Background levels ranged from 80 dB(A) to 89 dB(A). Various power screw drivers and cutting and drilling machines gave rise to intermittent sound levels from 90 to 115 dB(A). Only two employees were observed to be wearing hearing protection and the company did not have a Hearing Protection Program.

It was recommended that a selection of different hearing protectors be made available to employees and that the company institute a Hearing Protection Program including audiometric testing and sound level monitoring.

Solvent Exposure in an Industrial Laundry

In response to an employee request, this office investigated solvent exposures in an industrial laundry. Worker activities, including receiving solvent soaked shop towels, counting them and loading them into washing machines, led to excessive exposures to toluene and mineral spirits. Toluene exposures range from 32 ppm to 115 ppm and mineral spirits ranged from 275 mg/M^3 to 536 mg/M^3 in personal samples. Additive exposures were well over the combination Threshold Limit Value for several workers. In addition, storage and handling led to elevated background levels of three solvents.

Plans to reduce exposures included moving the whole facility to a new location and installing canopy hood local ventilation for the washer. Modification of handling of the solvent soaked towels was also recommended so that towels would be counted dry, stored in closed containers and handled with tongs. These changes would reduce inhalation and dermal absorption of hazardous chemicals.

Trichloroethylene and Excessive Noise in a Manufacturing Plant

A follow-up investigation was conducted at a Boston plant that manufactures outdoor electrical boxes and fixtures. An industrial hygiene evaluation in 1986 had revealed excessive exposure to trichloroethylene (411 and 574 ppm). A repeat visit in FY 1987 was scheduled to assess the adequacy of the controls instituted and to evaluate noise levels.

Air monitoring indicated that control methods had led to a decrease in the air concentrations of trichloroethylene (114 ppm), but the levels still exceeded the ACGIH TLV of 50 ppm. Recommendations were made for improved ventilation, changes in work practices, and a respirator program as an interim measure.

Noise exposures were evaluated with a sound level meter and using dosimetry for eight hour time weighted average levels. Sound levels as high as 102-105 dB(A) were measured at a trim press, tapping machine, and sander. Eight hour time weighted averages ranged from 84.7 to 101.8 dB(A). Although hearing protectors were available in some departments, audiograms were not provided, nor was training. Recommendations included engineering controls, sound dampening doors and covers and a complete hearing protection program.

Multiple Exposures in Rubber Manufacturing

Based on a request from ILGWU Health and Safety Department, a medical and industrial hygiene evaluation was initiated in a rubber manufacturing company. Numerous problems were noted including: friable asbestos coverings and pipe lagging, poorly controlled use of powdered lead and chromate pigments in the batching process, overexposure to talc in the Dust Room, intermittent high solvent exposures in the Spreader Room and an incomplete health and safety program.

Numerous improvements were instituted as a result of the investigation and increased attention by the union and management to workplace conditions. The company repaired the torn asbestos on the vulcanizer, improved general dilution ventilation, substituted a plastic mixed pigment to reduce lead chromate dust and began a medical monitoring program. A follow-up visit is scheduled in 1988 to ensure attention to all problem areas noted.

The comprehensive team approach of an occupational physician and industrial hygienist working together was further enhanced by consultation from an experienced industrial hygienist who had visited this company more than 30 years ago.

Follow-Up Visit to a Machine Shop

A 1986 visit to a machine shop manufacturing outdoor electrical boxes and fixtures revealed a solvent problem. Use of trichloroethylene degreaser had resulted in excessive exposures to the operator. Sampling during a 1987 follow-up visit showed concentrations had been reduced, but were still over the TLV-TWA. During this follow-up visit, evaluation of oil mist exposure, noise, and paint solvents were also conducted. Recommendations were made to further reduce solvent exposure and improve the hearing protection program in this company.

Migration of Lab Vapors into Offices

An evaluation was made at a university chemistry building regarding the migration of chemical vapors from labs into offices. Sampling for formaldehyde was done during lab classes where cats were dissected. Formaldehyde concentrations ranged from 0.2 to 0.5 ppm in the labs and from less than 0.01 to 0.04 ppm in non-lab areas. This indicated definite migration.

A ventilation evaluation showed two routes of vapor migration. One route resulted from a general ventilation system return air vent located in the lab. Lab return air was being mixed with return air from the offices and outside air, and then the mixed air was supplied to the lab and offices. The other route was through open lab doors into the corridors.

It was recommended that the return air vent in the lab be sealed and that lab hoods should be run, with lab doors closed, when dissections or other vapor emitting activities are performed.

Methylene Chloride Exposure

A survey was made of a small furniture stripping company. The company was operated by two men. Furniture was stripped using methylene chloride in an open front tank on legs. A small fan in the bottom of a door was the only ventilation in the room.

Personal air samples were collected on the furniture stripper and the results showed methylene chloride levels at 310 ppm. The NIOSH recommended TWA for methylene chloride is 75 ppm. Personal air samples were also collected on a worker in a room adjacent to the stripping room. Methylene chloride levels in this area were 72 ppm. It was determined that a large spray booth fan located in an adjacent room was pulling methylene chloride vapors from the stripping room into the adjacent work areas. Practical engineering controls, protective equipment, and work practices were suggested to keep workers exposure to methylene chloride as low as feasible.

Brake Lining Repair - Asbestos

Over the past year, the Consultation Program has received approximately 75 requests for testing asbestos exposure to auto mechanics during brake repair work. The requirements for initial air monitoring is part of the new OSHA Asbestos Standard which required such testing as of October 1986. The consultation program has visited these shops and is generally finding that the shops are not well informed of the health hazards of asbestos exposure and proper control measures. A fact sheet on asbestos brake linings has been prepared and is available through this office.

Formaldehyde Levels in Office

A visit was made to a local office of the American Lung Association where there were complaints about a pungent odor in the Conference Room of their new building. The room was also equipped with new furniture. Visitors to the office had experienced allergic reactions and respiratory symptoms.

Urea formaldehyde resin is sometimes in carpets, building materials, and some finished furniture products. It is generally accepted that formaldehyde may cause effects such as headaches and eye and mucous membrane irritation among individuals at concentrations below industrial health standards.

No official formaldehyde standard has been adopted for general indoor air pollution in homes, offices, and other non-industrial settings in the United States. The Massachusetts Division of Occupational Hygiene generally recommends a level of 0.1 for indoor air.

Air testing was done in the offices and the conference rooms of the Lung Association building. The airborne concentrations were found to be in the range of 0.20-0.28 ppm. The levels were above the 0.1 ppm recommended by this office.

Recommendations on ways to reduce the levels were made in the D.O.H. report which included keeping the area well ventilated at all times, even when the Conference Room was not in use. A follow-up visit after four months showed levels were reduced to 0.02 ppm.

Benzene Exposure during Chemical Mixing

In response to an employer request, a 7(C)1 Industrial Hygiene Consultant conducted employee sampling during a chemical mixing process. The two chemicals being mixed contained various solvents. The tests revealed an overexposure to a benzene carcinogen. The overexposure was attributed to the lack of ventilation and poor housekeeping. Recommendations were made to utilize local exhaust ventilation and improve work habits. Re-testing showed that benzene exposure was reduced below the OSHA permissible exposure limit.

Hazard Communication Program in a Manufacturing Company

An employer of a manufacturing company requested an on-site visit from a 7(C)1 Industrial Consultant to assist in their Hazard Communication (HC) Program. The purpose of the HC standard is to communicate chemical hazards to employees. Recommendations were made to update the written program and make material safety data sheets readily available. Training was provided to all management and supervisors with emphasis on chemical identification, hazard recognition and hazard prevention.

Student Intern Completes First Draft Of Hospital RTK Manual
(February - May, 1987)

A graduate student from the joint program at Boston and Harvard Universities was placed with the Right to Know (RTK) Program during the spring semester, 1987. Her work was supervised by the RTK staff. She went on-site to a variety of hospital settings and reviewed their product inventories, conducted walk-arounds and observed work practices. She completed a first draft of a RTK Manual for hospitals that reviews the location of RTK regulated chemicals and their use and hazards. It is primarily designed for the RTK coordinator of a hospital but could also be used by hospital unions. It will focus on requirements of the Massachusetts RTK Law but also encompass similar tasks mandated by the OSHA Hazard Communication Standard. The booklet is expected to be completed by the end of FY 1988.

Division Sponsors Occupational Health Internship Program

Every summer, through a grant from the Kellogg Foundation, UMass Medical Center coordinates a student training program that includes placing the student in an occupational health setting. This was the first year of the grant and the first time a student was sponsored by the Right to Know Program. The student that was chosen had been a machinist for five years and was currently finishing her Bachelor's Degree in Biology.

The student intern worked with both the Division and Local 66 of the Laundry and Dry Cleaning International Union. At the end of her internship she did a presentation on the hazards of dry cleaning establishments as part of the Division's monthly occupational health seminars. She also completed a Safe Practice Bulletin on Perchloroethylene.

As part of its role as a sponsor, a member of the Right to Know Program taught a three-hour class for the students on both the Massachusetts Right to Know Law and the OSHA Hazard Communication Standard. The class provided an historical overview of both laws, their requirements and how they differ.

Asbestos Contamination from a Hospital Fire

A private hospital requested assistance in evaluating how to handle asbestos contamination released by the extinguishing of a fire in a mechanical equipment penthouse. Luckily the ventilation units in the penthouse had been turned off before firefighters ripped down smoldering asbestos pipe lagging. There was no evidence of asbestos contamination in the ventilation units. Pipe lagging debris was on top of and between ventilation units. Hospital safety personnel had kept contamination from spreading beyond the penthouse and its entrance stairway by wet mopping and other methods.

It was recommended that the ventilation units be kept off until cleanup by properly equipped and trained people was finished. Debris was to be kept damp. In the later stages of cleanup, the insides of ventilation units access points were to be cleaned.

Two engineers from this office did air sampling as part of evaluating the cleanup activities.

Asbestos Abatement - Private College

Two large projects involving the removal of asbestos-containing materials were occurring simultaneously at a private college. Separate contractors were hired to remove roof slate and boiler casing and pipe lagging. Inadequacies in the personal protection, area containment, engineering controls and waste disposal were brought to the attention of D.O.H. and D.E.Q.E. Work has ceased until the contractors complied with the OSHA and EPA Asbestos Abatement Regulations. Recommendations made included proper respirator protection, polyethylene containment and decontamination unit, negative pressure air filtration, HEPA vacuums and the double bagging of wet waste in prelabeled polyethylene bags. D.O.H. made numerous visits to the location to verify that these measures were instituted and followed. The projects were completed in mid-September.

Lawsuit Averted

Two industrial hygiene engineers from the D.O.H. Asbestos Program presented an overview of asbestos removal projects, work practices and area conditions required by an asbestos abatement contractor to members of a school system. The presentation was requested following a controversy over whether or not a small removal project in a school's boiler room would put building occupants at risk to an asbestos exposure. The controversy led a member of the school system to take out a temporary restraining order against the asbestos abatement contractor.

Topics discussed at the presentation included D.O.H.'s role in asbestos removal projects, proper engineering controls required by federal law and final visual inspection, and air testing to determine if the area is clean and can be reoccupied. This presentation was given a second time to the teachers at the school where the removal was to take place.

The presentation and discussions held with the asbestos abatement contractor's lawyer helped relieve the fears and concerns of the school system. The restraining order was lifted. The removal took place and was monitored by an engineer from the D.O.H. Asbestos Program.

Removal Approved

A visit by the Asbestos Program to a building at a college resulted in the recommendation of the removal of the asbestos spray-on ceiling material found in the garage and maintenance area of the building. The report generated by the visit enabled the college to seek assistance from D.C.P.O. for the cost of the removal project. The project has gone out to bid and the removal is to take place next year.

Editor Seeks Advice from D.O.H.

An article appeared in an area magazine circulated to New England plumbing, heating, and cooling contractors. Posed with many questions from contractors regarding how best to handle asbestos removal in emergency cases, the editor contacted the D.O.H. Asbestos Program. The Program advised certain essential steps be taken in emergencies, including the use of an appropriate respirator, protective clothing, and that engineering controls be employed, such as wetting the asbestos before removal, promptly bagging the material, its proper disposal.

Occupational Health Physician from Finland Visits Division

In April 1987, the Asbestos Program hosted a day long meeting with a Medical Officer from a Regional Institute of Occupational Health in Finland. The Finnish Medical Officer was developing a nationwide asbestos program to "improve working conditions and to prevent asbestos related diseases". He visited with the D.O.H. Asbestos Program, Occupational Physician, and other interested D.O.H. engineers for a fruitful exchange of program development plans, objectives, and their implementation.

Rare Asbestos Product Poses Difficulties in its Removal

A rare application of asbestos presented persistent difficulties during the renovation of a state hospital building. D.O.H. Asbestos Program provided continued support during the project to D.C.P.O., D.M.H. and the general contractor in addressing the problem. The material, a solid roof plank measuring approximately 36" x 18" x 2.5", was considered non-friable under the EPA definition, yet required special procedures at various times during the renovation as it was a potentially friable material. Special isolation and containment structures were constructed on and under the roof for the removal of 400 square feet of the planking, which was necessary to accommodate new HVAC dormers. Additionally, special removal and bagging procedures were required.

Mercury Contamination

Contamination of an infant incubator from a broken mercury thermometer was confirmed by a consultant from the 7(C)1 Program. The unit was decontaminated with mercury absorbing chemical, then washed. Procedures were repeated until no mercury vapor was detected upon application of heat. The mattress was decontaminated in the same manner. Bedding showed no mercury vapor. It was recommended that all equipment and bedding be thoroughly aired and then disinfected.

Cyanide and Hydrogen Cyanide Exposure

Concerns about possible employee exposure to cyanide and hydrogen cyanide prompted this visit. As a result of both personal sampling and indicator tube readings, elevated levels of both chemicals were documented. Working with the production manager, the problem was pinpointed and corrected. Involved with this particular case was Dr. Rose Goldman who was contacted by an employee at this site. The employee was taken to the hospital with symptoms of cyanide poisoning. Unfortunately, the hospital did not take a blood test so the cause of the employee's attach can not be linked with 100% confidence to his occupation.

Small copper or brass parts were silverplated at this worksite. A predetermined load of parts were dumped into a plastic, perforated, rotating barrel. The parts were dunked into a heated caustic cleaning tank. After cleaning, the barrel was dunked through a triple counter flow rinse and then placed in a nitric-sulfuric acid bath. Two sided slot ventilation was provided over the acid tanks. The parts are then rinsed again and then plated in the potassium silver cyanide bath. This bath is cold. During the rinsing and plating process, the barrel is constantly rotated.

Thorough rinsing of the workpieces, after treatment with acid is necessary to prevent the acid from coming in contact with the cyanide and forming hydrogen cyanide (HCN) gas. Increased levels of HCN were found at the plating tanks immediately after the barrel was immersed in the cyanide tank. Several minutes into the plating process, the levels increased. These increased levels of HCN indicated incomplete rinsing and acid carryover.

Suggestions were made on site by the hygienist to increase each of the rinse cycles from one minute to three minutes. This was done but readings still indicated high levels of HCN. On the same day, pH readings were taken in the rinse tank. The readings indicated a slightly acidic rinse bath. Management experimented with the rinse cycle again and changed the process so the total rinse time was 14 minutes. Also, the barrel was raised above the tank lip, allowed to drain and rotate and then redunked. The amount of pieces plated and rinsed was decreased. The newly implemented rinse procedure significantly reduced the levels of HCN generated at the cyanide tanks. The double dunking may have provided an increased exchange of water among the parts, allowing for more effective rinsing. Stricter pH control of both rinses was also recommended as well as strict adherence to the new rinsing schedule.

Recommendations for local slot ventilation over the cyanide tanks were still made. Personal protective equipment was recommended as were a set of housekeeping rules and a recommendation for more, in-depth employee training about the hazards associated with the electroplating industry and cyanide and hydrogen cyanide gas.

Comprehensive Health Hazard Survey at a Cutlery

The Division was requested to investigate employee exposure to metal dust and fumes, chemical solvents, and noise. Operations involving the cutting, grinding and polishing of stainless steel did not result in an employee overexposure to metal dust due to the effectiveness of the local exhaust ventilation system. Atmospheric tests for lead dust and fumes taken during the tool hardening process revealed no overexposures. However, recommendations were made to correct housekeeping and ventilation deficiencies. Noise dosimetry measurements revealed overexposures to noise in the punch press and forging areas.

Defective Gas Heaters Create Overexposure to Carbon Monoxide

A call was received from an employer of a small company. Employees in the warehouse had experienced nausea, headaches, and dizziness. These employees were brought to the Lahey Clinic where they were found to have elevated carboxyhemoglobin levels.

The symptoms indicated elevated carbon monoxide (CO) exposure. The gas company was called in to check the gas heaters. Eight defective gas heaters were found. Immediately the gas heaters were turned off, shipping doors were opened and the overhead fans were turned on to reduce the CO in the warehouse air.

Air measurements were taken the following day to determine if the facility was safe to re-enter. Low levels, well below the standards, were detected. Employees returned to work and the warehouse was allowed to ventilate to remove all CO.

Ammonia Exposure in a Foundry

Our industrial hygiene consultants were invited to an aluminum foundry to determine employee exposure to by-product chemical vapors generated from the shell coremaking process. Shell cores were being produced in rollover-type coremaking machines using shell molding sand coated with phenol-formaldehyde resin with a hexamethylene-tetramine catalyst. Atmospheric tests for ammonia, phenol, formaldehyde, hydrogen cyanide, and carbon monoxide were taken in the breathing zones of the shellcore operators. The test results revealed ammonia concentrations exceeding the OSHA permissible exposure limit. Recommendations were made to install local exhaust ventilation to the shellcore machines and provide the operators with interim respiratory protection. The return visit, made following the installation of local exhaust ventilation, revealed ammonia concentrations well below the OSHA permissible exposure limit.

Lead Exposure at an Autobody Shop

A consultative visit was made to a small autobody shop to determine employee exposure to lead and chemical solvents during the spray painting of automobiles. Two operators were spraying automobiles with an acrylic enamel within an unventilated room. Atmospheric tests for lead revealed concentrations approximately eight times the OSHA permissible exposure limit. Our industrial hygiene consultant assisted the employer in the design of a new ventilated spray room, helped establish a medical surveillance program for the employees, and provided employee training on respiratory protection. A follow-up visit revealed lead concentrations below the OSHA permissible exposure limit.

Asbestos Encountered during Construction Project

The Asbestos Program was called out to a construction site in the Boston area where a General Contractor, in the midst of renovation activities, had encountered several asbestos problems.

A previous private survey for the former owner of the property reported that the facility contained no asbestos containing spray-on material nor asbestos-containing acoustical material. On that premise the general contractor did not include in the project plan any asbestos abatement for ceiling materials. Attention was drawn to the distinct materials by a sub-contractor on site, who collected samples and sent them out for analysis. Analysis of both the acoustical and the spray-on material by the D.O.H.

laboratory as well as the private laboratory indicated that both types of materials were asbestos-containing. With this knowledge the building with the exposed and disturbed spray-on material was closed off to prevent entry until which time the asbestos material was removed or encapsulated.

Follow-Up Noise Survey in a Paper Company

A follow-up visit was made by one of our Industrial Hygiene Consultants to a large paper company to evaluate employee noise exposure levels. Noise dosimetry and sound level meter measurements were taken at all eight of the company's paper mills. Since the previous visit of 1985, the company has implemented a variety of engineering and work practice controls designed to reduce employee noise exposures. Examples of these control measures include the installation of sound attenuating enclosures surrounding steam refiners, the use of vibration isolators to dampen large mixing machines, and the use of portable sound curtains for the rewind and finishing machines. In addition, many of the paper mills have installed soundproof enclosures which enables employees to monitor machinery and equipment without being exposed to very high noise levels.

Although the sound level meter measurements revealed that the machinery was still very loud, the noise dosimetry measurements taken on the employees demonstrated levels below the OSHA noise exposure limit. With the help of the Consultation Program, the paper company has since established mandatory hearing protection areas within the eight paper mills and has developed an in-house audiometric testing and training program.

Video Display Terminal Use and Reported Health Symptoms Among Massachusetts Clerical Workers

Final Summary of Findings January 1987

A cross-sectional, epidemiological study commissioned by the Massachusetts State Legislature was conducted by the Division of Occupational Hygiene staff with the assistance of an independent epidemiologist in 1984. The purpose of the study was to evaluate the association between typical, daily video display terminal (VDT) use and the prevalence of adverse conditions related to vision, musculoskeletal discomfort, headaches, and colds or sore throats among clerical office workers. A review of the literature had indicated that only a few well-controlled studies had assessed the extent and magnitude of adverse health conditions reported by VDT operators.

The study was conducted at 38 worksites selected at random within six industry groups. The industry groups were taken from a listing of Massachusetts employers of 50 or more workers and were industries expected to have a high prevalence of VDT use among their clerical workers. These six industries were banking, communications, computer and data processing services, hospitals, public utilities and the Commonwealth of Massachusetts. The final participation rates for the work sites in each industry group were as follows: banking, hospitals and the state agencies, 100%; communications, 80%; utilities, 71%; and computers, 67%. Although the participation rate by industry in communications was 80%, the largest employer in this industry group, representing approximately 60 per cent of all Massachusetts employees in communications, did not participate in the study. Originally, the insurance industry was included in the sample but, because of a low participation rate (43%), data from this industry were eliminated from the analysis. The participation rates for clerical workers in each work site ranged from 94 to 99 percent. Approximately 300 subjects were studied in each industry category.

Questionnaires were administered and completed by 2119 office workers at the worksites. The questionnaire sought information about demographic characteristics; nature of job including VDT use; the frequency of adverse vision conditions, musculoskeletal conditions, headache and colds or sore throats. Information was also requested concerning the presence of health conditions such as arthritis, migraine headache, and back or neck injury that might modify the frequency of evaluated outcomes

Of the questionnaires received, 1545 were found suitable for analysis. Data analysis included the measurement of the relation between daily VDT use and the prevalence of adverse vision conditions, musculoskeletal conditions, headache, and colds or sore throat by estimating the prevalence ratio, (the prevalence of cases of each condition among VDT users divided by the prevalence among non-VDT users) for three levels of daily VDT use. These levels were: 1/2 to 3 hours per day, 4 to 6 hours per day, and 7 or more hours per day. A case was defined as a respondent who answered "almost always" to any of the questions pertaining to the frequency of the particular health condition of interest or who "missed work" because of the condition. The effects of variables relating to age, cigarette smoking habit, type of industry, whether or not participants attended an educational VDT training class and the use of eye glasses or contact lens were included in the analysis.

The median age of the 1545 subjects was 34.5 years (range 17-72 years). Eighty-five percent were females. Eighty-eight percent of the subjects were White, eight percent were Black, and four percent were Hispanic, Asian or of another ethnic/racial background. The highest school level completed was high school or junior college for 84 percent of the subjects.

The prevalence ratio and 90% confidence interval indicate that workers who use VDTs four to six hours per day reported a 60 percent increase (90% confidence interval 1.2 -2.2) in the prevalence of adverse conditions related to vision compared to office workers who do not use VDTs. Workers who use VDTs seven or more hours per day reported a 140 percent increase (90% confidence interval 1.9 -3.0) in the prevalence. No effect on vision was observed among workers who use VDTs for three or fewer hours per day.

The prevalence ratio of musculoskeletal cases by daily video display terminal use for all six industries combined was increased for workers who use VDTs for four to six hours per day, or for seven or more hours per day, compared to workers who do not use VDTs. The magnitude of the increase was 20 percent (90% confidence interval 0.9 -1.5) for workers who use VDTs for four to six hours per day, and 80 percent (90% confidence interval 1.4 -2.2) for workers who use VDTs for seven or more hours per day.

The prevalence ratio of musculoskeletal cases differed somewhat depending upon the type of industry studied. Subjects who used VDTs seven or more hours per day and who worked in the industries of computer and data processing services, public utilities, and state agencies reported a higher increased prevalence of musculoskeletal conditions compared to their counterparts in banking, communications and hospitals. This difference in prevalence ratios was compatible with random variation in the prevalence of musculoskeletal cases.

There was an overall increased prevalence of headaches equal to 40 percent among workers who use VDTs seven or more hours per day in all industries combined. The increased prevalence of headaches, however, was confined to workers in computer and data processing services, public utilities, and state agencies. A decreased prevalence of headaches according to daily VDT use was observed for workers in the remaining three industries. The decrease, however, was largely attributable to the higher prevalence of headache cases observed among non-VDT users.

No consistent relation between daily VDT use and the prevalence of cold or sore throat cases was observed.

There were also no large, consistent differences in the estimates for the prevalence ratios according to the other variables measured; that is, age, cigarette smoking, wearing of glasses or contact lenses or attendance at a VDT educational training class. None of the medical conditions, such as, arthritis, migraine headache, or back or neck injury, which might have modified the frequency of the evaluated outcome was strongly associated with daily VDT use or any of the outcomes evaluated.

A pilot test of twenty-five workstations and surrounding areas was conducted for the primary purpose of developing a tool for ergonomic measurements, should a more extensive study be conducted at a later date. Tests for radiation emissions were also performed at the same number of workstations and surrounding areas. No levels of ionizing radiation above normal background were detected at the operator positions. No levels of nonionizing radiation were detected at the operator positions over the frequency range between 10 Kilohertz and 6 Gigahertz.

In summary, the study results indicated an increased prevalence of adverse conditions pertaining to vision, musculoskeletal discomfort, and headaches among clerical workers who use VDTs. The magnitude of the increased prevalence depended directly upon the duration of daily VDT use. The effects related to musculoskeletal discomfort and headaches were higher among VDT workers in computer and data processing services, public utilities, and the state employees than among workers in banking, communications, and hospitals. These latter effects, however, may have been due to random variation in musculoskeletal discomfort and headache prevalence.

DIVISION PRESENTATION HIGHLIGHTS

Occupational Health Seminars

In FY 1987, the Division of Occupational Hygiene continued its Occupational Health Seminar program. Issues of importance in occupational health were presented by either the technical or medical staff at the Division or by outside professionals. Speakers from other agencies included Wes Straub, of the National Institute for Occupational Safety and Health; Richard Clapp and Leticia Davis, of the Massachusetts Department of Public Health; Ron Petersen, of AT & T Bell Laboratories; Beverly Shalom, of the University of Massachusetts Medical Center's Occupational Health Program; and Ron Ratney, of the Occupational Safety and Health Administration.

The program has grown over the past year, with over 100 health professionals statewide now on the mailing list. They represent state and local agencies, occupational health clinics, universities, private businesses and community groups.

The following is a list of the seminars presented during the year:

- Setting workplace exposure limits
- Health and safety in dry cleaning and laundry
- Electroplating and cyanide exposure
- Safety aspects of laser systems used with fiber optics in the telecommunications industry
- Environmental lung disease
- Health effects of VDTs
- Occupational illness surveillance
- Hazardous waste clean-ups
- Drug testing in the workplace

7(C)(1) Consultants Present Talks

Consultants with the OSHA Consultation Program gave numerous presentations.

One presentation was made to North Shore employers on the historical background of the Division of Occupational Hygiene and the current services provided by D.O.H. programs. Another presentation was given to a group of jewelry and metal finishing manufacturers on the OSHA Consultation Program and the Hazard Communication Standard.

Employers found these talks very interesting and informative. The 7(C)(1) Program has received numerous requests for consultant services from employers who heard these presentations.

RTK: Your Obligation; Our Services

A RTK workshop was held for those in jewelry and metal finishing industries. A presentation was provided by a member of the RTK Program on the OSHA Hazard Communication Standard and how it differed from the state RTK Law. The technical and educational services available at the Division were reviewed. Over 25 employers attended. It was sponsored by the Department of Environmental Management in conjunction with the Southeastern Regional Planning and Economic Development District.

Panel Discussions - "Regulations and the Regulatory Experience"

A representative of the Division of Occupational Hygiene participated in a panel in a conference on the "Changing Employment and Legal Conditions in Health Care." The Conference was sponsored by the U.S. Department of Labor/Women's Bureau in conjunction with the Massachusetts Nurses Association and Massachusetts Coalition for Occupational Safety and Health. Over 35 people attended the half-day meeting held at the Federal Reserve Bank Building in Boston.

The conference encompassed health hazards (chemical and biological), union perspectives on employment conditions, and new policy initiatives for hospital and health care workers. Special concern was expressed by participants regarding AIDS, Cytomegalovirus and Hepatitis B.

The D.O.H. presentation was part of a panel entitled "Regulations and the Regulatory Experience", moderated by Ros Feldberg, Ph.D. and co-led by David Gute, Assistant Commissioner at DPH. The presentation gave an overview of the work of D.O.H. and emphasized the new asbestos regulations, the Right to Know Law and the importance of an informed work force. Several materials were distributed: (1) the ETO Safe Practices Bulletin; (2) "Your Right to Know, An Employee's Guide to the Right to Know Law"; (3) the last issue of Common Health in the Commonwealth; and (4) the Occupational Health Programs brochure.

Training Deleading Inspectors

In response to a request from the Department of Public Health, a member of the staff demonstrated proper sampling techniques for airborne lead dust to inspectors in the Childhood Lead Poisoning Prevention Program. A written protocol was also developed for their use. This assistance was part of a continuing project sharing D.O.H.'s expertise and equipment with DPH inspectors responsible for monitoring lead removal projects in private homes.

Paper Presented at the First International Conference on Education and Training in Occupational Health

This conference was the first international session on occupational health education and training and was held at McMaster University. Over fifteen countries were represented. A member of the Right to Know Program presented a paper entitled, "Right to Know Laws in the United States: Their Limits, Problems and Ethical Dilemna for Educators". The paper reviewed state and federal right to know laws and their deficiencies such as inadequate training requirements and its coverage of only chemical hazards. More importantly, it was pointed out that right to know laws stop short of giving employees the right to act to protect their health. The paper also emphasized that while these laws have created new job opportunities for health professionals, there are problems that result from this work. These problems include the dilemma of being hired by an employer but the client is the employee and whether to limit the training to only what is mandated by an imperfect law.

Radiation Control Supervisor Presents Seminar

A two and one-half hour seminar was conducted at D.O.H. during the afternoon of November 5, 1986. The seminar was attended by approximately 30 representatives from companies using RF Heaters or RF Sealers. The seminar covered review of the fundamentals of Nonionizing radiation, biological effects, 440 CMR 5.00, RF Safety Officer responsibilities, and survey methodology. A 16 minute NIOSH film was also shown.

Member of Staff Provides CPR Training to Division Personnel

Two cardiopulmonary resuscitation courses developed by the American Red Cross were presented at the Division by a fellow employee certified as a CPR instructor in January and February. A total of eighteen members of the staff are now certified to administer emergency CPR and various life saving techniques.

Asbestos Program Supervisor Participates in Meetings

In August at the request of the U.S. Department of Energy a technical conference was held in Portland, Maine. Technical information as well as current trends concerning asbestos in Massachusetts were discussed in a round table format by the Asbestos Program Manager.

The supervisor attended the American Public Health Association annual meeting held in Las Vegas, Nevada from September 28th to October 2nd, 1986 covering issues concerning asbestos. These discussions were from technical, administrative and medical perspectives. Two major topics were the evaluation of abatement methods for controlling asbestos in school buildings and the significance of education and training in controlling asbestos hazards. Other discussions presented in the occupational health section involved case studies of insulation workers exposed to asbestos and the problems of medical screening to document asbestos related diseases.

RTK Addresses Business Association

A member of the Right to Know Program was a featured speaker at two conferences entitled, "Community and Workplace Right to Know for Hazardous Substances". It was sponsored by the New England Legal Council, Inc., a business association representing the interests of industry in the New England region. The presentation reviewed the employer responsibilities mandated under the RTK Law and the activities and services of the Department of Labor and Industries. Over 60 business representatives attended the sessions.

Presentation on Asbestos to County Health Agents

A County Board of Health Agents (approximately 15) met at a courthouse for a workshop on Asbestos Containing Material (ACM). A Department of Public Health member and a member of the Asbestos Program were the guests speakers. A 30 minute slide show on ACM, removal practices, health effects, sample collection and the D.O.H. policy on receiving samples was described. Respiratory protection was discussed. The D.O.H. bid specifications were reviewed. Bid specifications and sample collection information was also distributed. The DPH representative discussed the sanitary code. The information was well received and many questions were raised demonstrating interest and concern.

CONTINUING EDUCATION ACTIVITIES

Industrial Hygiene Laboratory Quality Control Course

The Assistant Director attended the five day Laboratory Quality Control Course #587 held at the NIOSH Laboratories in Cincinnati from August 25-29, 1986 to acquire knowledge of specific recommendations and requirements for AIHA Laboratory Accreditation. It was learned that the process takes from fifteen months up to two years once application for same is made.

In addition to meeting specific personnel qualifications, a quality control or "policy" manual must be written. The course outlined 22 elements which should be in place and included in the manual. Another feature of the course was a presentation of the five priority areas where a site inspector has found weaknesses. From knowledge gained it is the goal of the Division to be prepared to file an application for laboratory accreditation during Fiscal '88.

Radiation Officer Attends Meeting

The Industrial Radiation Control Supervisor attended ANSI C-95 Sub Committee Working Group meeting relative to revision of ANSI C95.1-1982 standard held at Bell Laboratories, Murray Hill, N.J.

Director Attends Second Annual Fall Technical Conference of the National Asbestos Council

The Director of the Division of Occupational Hygiene participated in this conference which provided many technical sessions including federal regulatory updates and many other sessions which will benefit the department in formulating the asbestos regulations which are being drafted.

Conference on Reproductive Health Hazards to Hospital Workers: Rights, Risks, and Responsibilities

Two representatives of the Division of Occupational Hygiene attended a conference on October 23-24, 1986 sponsored by the American Hospital Association. This conference, held in Cambridge, was their fourth annual national gathering to discuss employee health within hospitals. The focus of the one and a half day conference was reproductive health hazards.

The conference encompassed: (1) the magnitude of the problem of adverse reproductive outcome, (2) hazard identification including chemical hazards, radiation, and biohazards, (3) managerial and legal considerations and (4) implementation of desired improvements in protection.

One highlight of the program was a presentation by Grave LeMasters, MSN, PhD, summarizing recent studies documenting fetal loss and birth defects experienced by hospital workers using anesthetics, solvents, ethylene oxide, and antineoplastic (cytotoxic) agents. She reviewed an analytical approach to surveying exposed personnel, evaluating the opportunities for exposure and absorption, potential health effects and methods of control. She also discussed the value of restrictive policies which might seek to exclude male and female workers trying to conceive, pregnant women and breast feeding mothers from hazardous jobs.

Other topics presented included: physiological changes that affect a pregnant women's absorption of chemicals; OSHA's limited coverage of reproductive hazards (only three chemicals have standards considering reproductive effects; DBCP, lead and ethylene oxide); criteria for sufficient evidence for reproductive hazards; elevated rates of spontaneous abortions among teachers and nurses; fetal rights to sue the employer for damages suffered from toxic exposures at parent's workplaces; the concept of ALARA (as low as reasonably achievable) in regards to radiation exposure; and much more.

EPA Sponsors Course at Georgia Institute of Technology

Three representatives of the Department of Labor and Industries attended a week long course "Interim Procedures and Practices for Asbestos Abatement Projects" conducted at Georgia Institute of Technology and hosted by the U.S. Environmental Protection Agency to allow state agency staffs to become familiar with the content of a high-quality abatement training course and to encourage them to develop training requirements in their own states as part of asbestos abatement contractor regulations. In addition to the course contents an additional session was held discussing reciprocity possibilities regarding training requirements and enforcement between states.

Training materials regarding the course, including slides and overheads, were presented to a representative of each state. Specific topics covered in the course included Background Information Concerning Asbestos Abatement, Health Effects of Asbestos Exposure, Legal and Insurance Considerations, Contract Specifications Establishing a Medical Surveillance Program, Respirators, Other Safety and Health Considerations, Sampling and Analytical Methodology and Glovebag Training.

The material in this course proved valuable to the attendees in developing the reasonable requirements necessary to protect the health and safety of employees and others engaged in the removal, containment or encapsulation of asbestos or materials containing asbestos which was mandated by legislation signed into law on January 7, 1987.

Annual All Day Meeting of New England AIHA Association

On November 13, 1986 twelve members of the Division of Occupational Hygiene attended an all day seminar on asbestos abatement sponsored by the New England AIHA.

The following topics and speakers were observed.

1. NEW OSHA ASBESTOS REGULATIONS VS OLD ASBESTOS REGULATIONS,
   Dr. Ronald Ratney
   Assistant Regional Administrator-Technical Support, USDOL-Occupational Safety & Health Administration, Region I

2. CONTRACTOR'S LICENSING REQUIREMENTS FOR ASBESTOS ABATEMENT WORK IN THE STATE OF RHODE ISLAND
   William P. Dundulis, Jr.
   Principal Industrial Hygienist, R.I. Department of Health, Division of Occupational Health & Radiation Control

3. HEALTH & SAFETY TRAINING OF ASBESTOS ABATEMENT WORKERS
   Jim Merloni, Jr.
   Administrator, New England Laborer's Training Trust Fund

4. METHOD 7400-ASBESTOS ANALYSIS
   Robert Weker
   Chemist, Harvard University, Department of Environmental Health & Safety

5. THE CONTRACTOR'S PERSPECTIVE
   Lee Snodgrass
   President, DecTam Corporation

6. ASBESTOS RELATED LITIGATIONS
   Samuel L. Silverman, Esquire
   Associate Regional Counsel, Environmental Protection Agency, Region I

Massachusetts Public Health Association Conference

On November 21, a staff member of the Right to Know Program attended a conference sponsored by the Mass. Public Health Association entitled, "Right to Know-the Duty to Act." The conference dealt with the communication of hazards to both workers and the general public, and with the right to control or reduce those hazards. Tony Mazzochi, former Health and Safety Director of the Oil, Chemical and Atomic Workers Union, was the keynote speaker; and the specific hazards covered were asbestos, lead, pesticides and noise.

Material Safety Data Sheet Symposium

A member of the Right to Know staff attended a one-day conference, Society for Risk Analysis, on the use and design of Material Safety Data Sheets as they relate to Right to Know and Hazard Communication laws. Topics presented included:

- Legal Principles Underlying MSDSs
- Toxicological Principles
- Communication Principles
- Critical Problems

Massachusetts RTK Conference

Four members of the Right to Know Program attended a conference on the Massachusetts Right to Know Law. It was a public policy forum with two-way audio and video interaction between Boston and Springfield. Members on the panel included representatives from government agencies (DLI & DEQE) and private groups (MASSPIRG, AIM, MassCOSH, etc.). The conference was held on November 13, from 9:30-12:30 and was sponsored by University of Massachusetts' Institute of Governmental Services.

The Eighth Annual New England Occupational Health Conference

"Health Promotion in the Workplace: A Critical Appraisal of its Effectiveness" was attended by four members from the Division. Topics covered included the following:

1. Types of health promotion programs that can be offered at the workplace: hypertension management, stress management, fitness programs and heart disease; nutrition, smoking cessation, and physical examinations.

2. How effective is the health promotion and what are the cost benefits?

3. Perspective of health promotion from a representative of management, labor and insurance carriers.

As a result of the seminar, the Division Director plans to provide health promotion programs for the employees at the Division of Occupational Hygiene starting in January 1987.

Health Effects of Asbestos: Controversies and Fundamentals

A member of the Asbestos Program attended a one day seminar at the Harvard School of Public Health which described and argued the inadequacies in diagnostic techniques and epidemiologic studies.

Engineers Participate in Harvard Short Courses

Eight members of the Division participated in the short course at Harvard entitled Occupational & Environmental Radiation Protection. The course provided participants with the fundamentals necessary for working safely with radiation in nuclear facilities, industrial installations, medical and educational institutions and research laboratories.

The course provided in-depth coverage of current radiation protection standards, associated Federal laws and regulatory guides, and state of the art in laboratory and field monitoring equipment including demonstration and calibration of the laboratory and survey instruments.

Seven new engineers in the Division attended the one week course "Fundamentals of Industrial Hygiene" held at Harvard University School of Public Health from March 30, 1987 to April 3, 1987. It is a goal of the Director to have all new personnel participate in this course which covers OSHA regulations, sampling strategies, principles of ventilation as well as many other general topics.

Two members of the Division attended the course at Harvard on Risk Analysis in Occupational Health Methods which discussed the interplay of risk evaluation and risk assessment. Sessions provided an overview for assessing occupational cancer risks and health risks associated with specific contaminants in the occupational setting as well as physical agents such as ionizing radiation.

A five day seminar an Industrial Ergonomics on Human Factors in Occupational Health & Safety was attended by the occupational health nurse. The course was very comprehensive and included the following areas:

1. History and Definition of Ergonomics
2. A & P and Biomechanics of the Spine
3. Epidemiology, cause and control of injuries or illnesses that can result from a lack of good ergonomic principles in the work setting. These conditions include low back pain, ruptural disc, carpal tunnel syndrome, tendonitis and other muscle and joint pains.
4. Recommended workplace designs for VDT stations
5. Work Physiology and Human Fatigue
6. Recommended safety practices and guards for machines to avoid or reduce accidents.
7. Definition, frequency and control of human error.

A number of literature and audio-visual references were distributed or shown during the course.

D.O.H. Staff Participate in NIOSH Courses

Occupational Respirator Protection (593)

Twenty-one employees of the Division attended a three-day course on occupational respiratory protection offered by the U.S. National Institute for Occupational Safety and Health. Staff from the Division of Industrial Safety and the Massachusetts National Guard were also in attendance. The course included both instruction on the components of a workplace respirator program and hands-on training on various kinds of respirators. Some of the topics covered were: "Elements of an Acceptable Respirator Program", "Surveillance of a Work Area - Instrumentation", "Cleaning, Maintenance, and Storage", and "Practical - SCBA and Other Supplied Devices."

Asbestos Air Sampling Course (582)

From April 20 to April 24, 1987 members of the Division attended a course which addressed asbestos air sampling and evaluating techniques in detail. The theory and explanations presented in the lectures were applied in a "hands-on" laboratory to reinforce each concept. After completing the course those involved with asbestos analysis were able to properly use sampling and evaluating equipment and to apply the procedures necessary for the collection and evaluation of airborne asbestos dust samples. The course was conducted by a representative of the National Institute of Occupational Safety and Health (NIOSH). This course was needed to update the Asbestos Program laboratory to be in conformance with new OSHA regulations.

New Technologies Safety and Health Institute Conference

Two representatives from the Division of Occupational Hygiene attended a two day conference entitled "New Technologies: Responding to Future Risks", on May 28-29, 1987. The conference was sponsored by Worcester Polytechnic Institute, Clark University, and UMass Medical Center, collectively called the Worcester Consortium for Higher Education.

The program consisted of four main sections: (1) a plenary session addressed by a corporate representative, labor representative and congressional researcher, with a keynote speech by Lieutenant Governor Evelyn Murphy; (2) a workshop addressing specific case studies regarding control of new technology's hazards; (3) theoretical applications of risk assessment, risk management and policy development, and (4) presentations on "Looking into the Future", treating the questions of the role of unions, the role of regulation and future research needs.

American Association of Occupational Health Nurses Conference

The annual convention of the American Association of Occupational Health Nurses held at the Sheraton-Plymouth Hotel was attended by the occupational health nurse on June 3-5, 1987.

The following education sessions were attended in addition to informal sessions and exhibits:

1. Reproductive Hazards in the Workplace.
2. Assessing the Workplace: Health, Safety and Ergonomic Hazards.
3. Humanizing Health Care with Humor.
4. Update on Gynecological Issues.
5. Marketing in Occupational Health Nursing.
6. Reports of Occupational Health Success Programs in Industry.

OSHA Institute

Consultants with the 7(C)(1) Program attended numerous courses offered by the OSHA Training Institute this past year. The new consultants each attended the two mandatory training courses. These were the three week Initial Compliance Course for Industrial Hygienist and the Basic On-Site Consultation Training.

Another consultant attended the "Applied Foundry Principles" course held in Muskegon, Michigan. The course included: indepth discussion of foundry principles, production practices, hazards, and related OSHA standards. Course highlights included hands-on training in an operating foundry.

Also attended was the Industrial Toxicology course which included: review of recent toxicological data related to OSHA Standards, biological monitoring, update on current toxicological testing, and chemical hazards encountered in the industrial environment.

Lastly, a number of the program attended the "Industrial Noise" course which covered the physics of noise, its generation and control.

American Industrial Hygiene Association Conference

The annual American Industrial Hygiene Conference was held in Montreal Canada. Twelve members of the Division attended the Conference. Three members participated in examinations for certification as industrial hygienists. Staff members participated in the following courses.

Hazards in Hospitals was a course which dealt with problems of ergonomics found in laboratories while doing microscopic work, dangers encountered in chemotherapy and ethylene oxide used in sterilization.

Environmental law was a course directed to practicing industrial hygienists who have co-responsibilities in environmental areas. A general overview of air, surface water, hazardous waste and ground water regulations was given by two attorneys.

Toxicology of Selected Petroleum Hydrocarbons provided an introduction to the distillation process and the fractions obtained from different crude oils. The toxicological profiles of selected fractions were observed to demonstrate the range of biological activity from these complex mixtures and how petroleum chemistry and the refining processes are used to minimize the manufacturing of the more potent toxic petroleum-derived materials.

Occupational Ergonomics was a course focusing on upper extremity cumulative disorder, such as carpel tunnel syndrome and tendonitis. These are a major cause of workers' compensation in many hand intensive industries. Methods were discussed to design the job to minimize and control occupational trauma disorders.

Operation and Selection of General Purpose, Direct-Reading, Organic Vapor Instruments reviewed the principle of operation and limitations of common combustible gas indicators; National Fire Protection Association guidelines for classifying hazardous atmospheres; and certification of instruments for safe use in hazardous atmospheres. Additional course material included new developments in direct reading instruments using gas chromatographic detectors; developments in real time personal dosimetry; and specialty instrumentation for monitoring sulfur hexafluoride tracer gases and formaldehyde. The operation of selected instruments was also demonstrated.

Introduction to Inhalation Toxicology provided knowledge in understanding the toxicology associated with various toxic moieties which are introduced into the body via inhalation and target the respiratory system. Various occupational hazards were addressed which could induce bronchoconstriction, pulmonary hypersensitivity, pulmonary irritation and pneumoconiosis.

While attending the 1987 American Industrial Hygiene Association Conference in Montreal, three members of the D.O.H. Asbestos Program participated in an optional tour to an operating asbestos mine, sponsored by the Asbestos Institute of Quebec, Canada. The Jeffery Mine which is located in the Town of Asbestos, Quebec and operated by the Johns-Manville Corporation is the largest single open pit asbestos mine in Canada. Included in the tour were visits to the face of the pit, a walk-through of the massive 12-story processing facility, and a luncheon held in a civic facility in town, at which local attitudes toward asbestos were discussed. The members were generally impressed with the ubiquitous nature of the asbestos mineral, both inside and outside the mine areas, the size and technical complexity of the processing operation, the levels of airborne asbestos fibers to which workers are exposed without respiratory protection, and the relatively casual local attitudes toward the threat of asbestos-related pneumoconiosis in their working environment and community.

Many technical sessions were attended by members and knowledge gained was shared with the rest of the Division. Once again members were provided the opportunity to see the latest equipment used in the field for surveying as well as in our laboratory.

D.O.H.
Environmental Measurements
(Direct Reading Measurements or Determinations Reported)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Radiation		
Source Shielding	1	0
Alpha Radiation	75	0
Beta Radiation	1068	0
Gamma Radiation	1224	12
Gamma Radiation Sealed Sources	221	2
X-Radiation	1649	14
Other Ionizing Radiation	5	0
Long Wave Radio Frequency	1417	46
Ultra Violet	8	3
Microwave	1548	8
Assistance Radiation	1	0
Total	7217	85
Noise		
Noise Continuous (Action Level)	376	185
Noise Continuous (PEL)	285	87
Noise, Impact	126	81
Total	787	353
Ventilation		
Exhaust	616	74
Comfort Ventilation	707	180
Air Current	18	0
Illumination	80	28
Temperature & Humidity	429	14
Total	1850	296
Chemical		
Acetic Acid	7	0
Acetone	3	0
Ammonia	6	0
Calcium Hydroxide	7	7
Carbon Dioxide	1396	257
Carbon Dioxide Dosimetry	8	4
Carbon Monoxide	578	41
Chlorine	6	0
Chromium, Metal & Insoluble Salts	3	0
Cobalt Metal, Fume & Dust	3	0
Combustible Gas	71	0

Environmental Measurements (cont.)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Chemical (cont.)		
Copper Fume	6	4
Dichlorodifluoro-methane	8	0
Ethanolamine	1	0
Ethyl Alcohol	1	0
Ethylene Oxide	7	2
Formaldehyde	9	0
Halothane	6	0
Hexamethylene Diisocyanate	6	1
Hexone	1	0
Hydrazine	4	0
Hydrogen chloride	3	1
Hydrogen cyanide	7	0
Hydrogen sulfide	72	0
Iron Oxide Fume	3	0
Isophorone Diisocyanate	5	1
Isopropyl alcohol	6	0
Mercury, (organo) alkyl compounds	35	0
Mercury, Inorganic	45	0
Methane	12	0
Methyl alcohol	4	0
Methyl chloroform	2	0
Methyl methacrylate	6	1
Methylene Bisphenyl Isocyanate	16	0
Mineral Cutting Oil	6	6
Nitric Oxide	25	0
Nitrogen Dioxide	77	0
NO_2 Dosimetry	2	0
Nitrous Oxide	35	9
Oil Mist	2	0
Oxygen	7	0
Oxygen Difluoride	7	0
Ozone	16	1
Perchloroethylene	8	1
Phenol	3	0
Phosgene	2	0
Phosphine	7	0
Suflur Dioxide	15	0
Toluene	3	0
Toluene-2,4-Diisocyanate	16	0
Trichloroethylene	5	2
Welding Fumes	2	0
Total	2585	338

Environmental Measurements (cont.)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
General		
Additive Exposure	2	1
Assistance General	5	0
Biological Monitor	1	0
Chemical Storage	9	6
Confined Spaces	4	1
Emergency Procedures	42	0
Employee Monitoring	2	2
Eye, Face Protection	40	23
Fire Hazard	2	2
General Assistance, HC	5	2
Gloves	6	0
Housekeeping	41	29
Indoor Air Pollution	10	2
Labelling, HC	58	40
Leakage Testing	1	1
MSDS, HC	36	23
OSHA Log	42	0
Physical Exam	13	0
Protective Clothes	28	12
Questionaire	37	0
Records	7	5
Registration	2	1
Respirator Program	34	26
Safety Hazard	7	5
Security	2	2
Training, HC	65	63
Walk Through	36	0
Work Practice	69	38
Written Program, HC	47	30
Total	653	314
Asbestos		
Assistance, Asbestos	20	2
Bagged Waste	37	8
Containment	134	24
Debris	451	236
Engineering Control, Asbestos	113	17
Final Clean-up	115	18
Glove Bag Training	46	0
Other Asbestos	111	29
Protective Clothes, Asbestos	31	5
Respirator, Asbestos	42	10
Review Asbestos Casing	242	120

Environmental Measurements (cont.)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Asbestos (cont.)		
Review Asbestos Pipe Covering	997	480
Review Asbestos Spray-On	787	220
Showers, Asbestos	31	3
Signs, Asbestos	69	5
Total	3226	1177
Nursing		
Certified First Aiders	42	4
Consulting Physician	42	6
Questionnaire	35	0
Nursing Assistance	88	1
Medical Records	77	3
Medical Directives	42	3
First Aid Supplies	42	0
First Aid Log	42	0
First Aid Posting	42	8
First Aid Room	42	4
Total	494	29
Right to Know Program		
Annual Training, RTK	95	94
Central Location MSDS, RTK	59	27
Chemical Inventory, RTK	120	84
Chemical Name, RTK	61	57
Coordinator, RTK	34	6
Diligent Effort, RTK	36	28
Employee Access, RTK	46	34
Employee Rights Training, RTK	100	95
Filed with DEQE MSDS, RTK	80	53
General Assistance, RTK	9	0
Labelling Assistance, RTK	3	0
Legible Label, RTK	25	25
MSDS Assistance, RTK	5	1
New Employee Training, RTK	84	83
NFPA Label, RTK	44	44
Reading MSDS Training, RTK	99	95
Received/Reviewed MSDS, RTK	106	96
Recordkeeping Assistance, RTK	8	1
Specific Hazards Training, RTK	86	84
Training Assistance, RTK	1	0
Type Size Label, RTK	44	44
Workplace Notice, RTK	80	37
Total	1225	987

Air and Bulk Samples Collected & Analyzed in Laboratory

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Acetone	35	0
Ammonia	12	0
Amyl-Acetate	6	0
Asbestos Bulk	1603	1074
Asbestos Air	112	94
Benzene	5	0
Butanol	20	0
2-Butanone	41	0
Butoxyl Ethanol	9	0
n-Butyl Acetate	19	0
Butyl Cellosolve Acetate	2	0
Cadmium, bulk	3	0
Cadmium, fume	1	0
Calcium Oxide	3	2
Carbon dioxide dosimetry	5	0
Carbon monoxide dosimetry	5	0
Copper Bulk	3	0
Copper Fume	9	1
Cyclohexane	11	0
Cyclohexanone	9	2
Diacetone Alcohol	3	0
o-Dichlorobenzene	16	0
Diiosobutyl Ketone	11	0
Wood Dust, Hardwood	5	0

Air and Bulk Samples Collected & Analyzed in Laboratory (cont.)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Wood Dust, Softwood	2	1
Nuisance Dust, Total	13	0
Nuisance Dust, Respirable	8	0
Ethanol	19	0
2-Ethoxyethanol	1	0
Ethoxyethyl Acetate	3	0
Ethyl Acetate	18	0
Ethyl Methacrylate	4	0
Ethylene Oxide	49	18
Fluorotrichloromethane	4	0
Formaldehyde	144	14
Gas Chromatograph Scan	59	0
Gasoline	2	0
Hexane	8	0
Hexone	27	0
Iron Oxide	4	2
Isobutyl Acetate	27	0
Isobutyl Alcohol	7	0
Isophorone Diisocyanate	5	1
Isophorone	4	0
Isopropyl Acetate	18	0
Isopropyl Alcohol	46	1
Lead Bulk	7	0
Lead	100	59
Manganese Dioxide	22	0
(MDI) Methylene Bisphenyl Isocyanate	10	0

Air and Bulk Samples Collected & Analyzed in Laboratory (cont.)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Metal Scan	2	0
Metal Fumes	4	0
Methanol	39	17
Methyl Cellosolve	7	0
Methyl Chloroform	30	0
Methyl Ethyl Ketone	18	0
Methylene Bisphenyl Isocyanate	17	0
Methylene Chloride	13	1
Methyl Methacrylate	2	0
2-Methoxy Methanol	15	0
Methyl Isobutyl Ketone	73	2
Mineral Spirits	13	12
Molybdenum	1	0
Naphtha	6	0
Nickel	5	1
Nickel Chloride	1	0
Nickel Sulfate	1	0
Nitric Acid		
Nitrobenzene	8	0
Oil Mist	3	0
Ozone	33	5
Perchloroethylene	22	0
Petroleum Distillates	78	10
Phenol	8	0
Phosphoric Acid	2	0
Polychlorinated Biphenyls	28	0

Air and Bulk Samples Collected & Analyzed in Laboratory (cont.)

Substance or Condition	Number	Found in Harmful Exposure Range or Problem Detected
Propyl alcohol	3	0
Pyrethrum	3	0
Rubber Solvent	3	0
Silica	18	2
Silicon	3	0
Sodium Hydroxide	5	0
Styrene Monomer	1	0
Sulfur Dioxide	2	0
Sufluric Acid	6	0
Tin Oxide	5	0
Toluene	82	3
Toluene-2,4-Diisocyanate (TDI)	16	0
TCE	2	0
TCP	2	0
1,1,1 Trichloroethane	62	2
Trichloroethylene	19	1
Turpentine	3	0
Vinyl Chloride	3	0
VMP	2	0
Welding Fumes	9	0
Xylene	84	0
Zinc, Bulk	3	0
Zinc Oxide Fumes	12	0
Zirconium	2	0
Total	3338	1325

Sources of Inquiry

Source	Services	Information
Employer	931	540
Employee	186	171
Labor union	64	64
Health Agency	105	130
Town Health Agent	55	42
Attorney	2	37
State Agency (Management)	249	86
Other State Agency	15	
Local Agency (Management)	332	73
Legislature	3	9
Internal	223	1
Public	13	371
Division of Industrial Safety	76	17
Undifferentiated	56	
Total	2310	1541

Recommendation Summary

Project	Number Made	Employees Affected	Students or Public Affected
Asbestos	1,911	26,852	273,056
7(C)1	1,203	5,998	3,478
RTK	443	39,573	134,795
Medical	172	38,288	0
Radiation	153	4,327	4
State Side	3,655	16,529	25,346
Total	7,537	131,567	436,679

AUDIOVISUAL LIBRARY

VIDEOTAPES AVAILABLE FOR LOAN

TITLE	SOURCE	LENGTH
AIDS Awareness	HBO	20 min.
AIDS in the Workplace	NIOSH	20 min.
AIDS in Medical Settings	DOH	90 min.
Arts and Crafts Hazards	DOH	90 min.
Asbestos Abatement: Video Guide to the Process	Source Finder	63 min.
Asbestos - The Lethal Legacy	Nova	
Bhopal Talk on Methyl Isocyanate	NEAIHA	40 min.
Cancer Agents in the Workplace	OSHA	12 min.
Case Study of Assembly Line Work	NIOSH	20 min.
Chemical Safety: An Overview of the Hazard Communication Standard	Industrial Training, Inc.	20 min.
Control of Carcinogens in the Lab	OSHA	25 min.
Criminal Prosecution in Cases of Work Related Death	Gareth Levitton	
Don't Blow It--Asbestos Action Program	U.S.E.P.A.	16 min.
Electroplating and Cyanide Poisoning	DOH (R. Goldman and K. Harvey)	90 min.
Engine Exhaust in Fire Stations	DOH	90 min.
Environmental Lung Disease	DOH	
ETO in Hospitals	NIOSH	20 min.
Familiarization with the Microscope	NIOSH	53 min.
Foundry Safety and Health	OSHA	30 min.
GAO Executive Seminar-Asbestos Part I and II (2 tapes)	Morton Corn	
Guide to Negative Air Filtration Systems: Asbestos	Source Finder	42 min.

TITLE	SOURCE	LENGTH
Hazardous Waste Sites	DOH (Wes Straub)	90 min.
Health Effects of Asbestos	O.H. Clinic S.F. General Hospital	17 min.
Health Hazards in the Micro-electronics Industry Lead	DOH	90 min.
If You Can't Stand the Heat - Hazards of Heat	U.S. Navy	22 min.
Isocyanates	3M	15 min.
Microscope Set-up Procedures	NIOSH	59 min.
Personal Sampler Calibration	NIOSH	11 min.
Pines, Sen. Lois; Speaking on Occupational Health & Safety Legislation	DOH	90 min.
Reproductive Hazards on the Job	DOH	90 min.
Right to Know - Making it Work	AFL-CIO	28 min.
Rotameter Calibration	DOH	
Safety-T-strip Glove Bag Technique for Asbestos Pipe Insulation Removal		
Sound Level Meter Calibration	NIOSH	7 1/2 min.
Testing Buildings for Asbestos Hazards	Source Finder	70 min.
VDT Study	DOH	90 min.
Woburn Case	Nova	60 min.

RECOMMENDED SAFE PRACTICES BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Accident Prevention
1169	1	Welding Explosions
		Chemical Data Sheets
1233	1	Formaldehyde
1234	2	Carbon Tetrachloride
1144	3	Benzene
1236	4	Carbon Disulfide
1329	5	Chromates
1342	6	Carbon Monoxide
1328	7	Trichloroethylene
1317	8	Ammonia
1326	9	Mercury
1279	10	Hydrogen Sulfide
1354	11	Fluorides
1149	12	Cadmium
1073	13	Methanol
1361	14	Lead
1180	15	Methyl Ethyl Ketone
1048	17	Acetone
1302	20	Oxides of Nitrogen
1292	21	Petroleum Naphtha
1309	22	Zinc
1323	23	Sulfur Dioxide
1129	24	Cyanides
1251	25	Organic Acetates
1370	26	Toluene
1396	27	Perchloroethylene
1182	28	Beryllium
1074	29	Methyl Chloroform
1255	30	Uranium
1043	31	Butyl Alcohol (N-Butanol)
1369	32	Parathion
1316	33	Isocyanates
1185	34	Epoxy Resins
1366	35	Ozone
1261	36	Chlorine
1262	37	Styrene
1263	38	Aniline
1282	39	Xylene
1285	40	Inorganic Arsenic
1301	41	Tetrachloroethane
1303	42	Dioxane
1367	43	Ethylene Oxide

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Material Safety Data Sheets
1410	1	Asbestos
1405	2	Cadmium (dust or fume)
1406	3	Carbon Monoxide
1407	4	Methane
1408	5	Ozone
1394	6	Polychlorinated Biphenyls (PCBs)
		Medical Data Sheets
1371	1	Anthrax
1350	2	Brucellosis
1027	3	Leptospirosis-Weils's Disease
1357	4	Erysipeloid
1372	5	Ornithosis (Psittacosis, Parrot Fever)
982	6	Gas Gangrene
1049	7	Tetanus - "Lockjaw"
1151	8	Poison Ivy Dermatitis
1224	9	Cutting Oil Dermatitis
1244	10	Personal Hygiene in Handling Epoxy Resins
		Mineral Data Sheets
1222	1	Silica
1352	2	Asbestos
1290	3	Mica
1321	4	Pumice
1324	5	Talc
1322	6	Granite
1304	7	Silicon Carbide
1320	8	Aluminum Oxide
1327	9	Fibrous Glass
		Nursing Data Sheets
1117	1	Plant Shuttle Service
1358	2	Information Concerning Pregnant Employees
1346	3	Eye Safety Program
1356	4	Epilepsy
1293	5	Emergency Medical Transportation
1355	6	Recommended First Aid Supplies
1241	7	First Aid Log

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Nursing Data Sheets (cont.)
1202	8	Hearing Conservation
1145	9	Heimlich Method of Resuscitation
1154	10	Occupation/Work History
1246	11	Color Coding
1345	12	Massachusetts Poison Control System
1365	13	Services Available for Health and Educational Material
1205	14	Guidelines for Informing Employees of Medical and/or Laboratory Findings
1226	15	First Aid Monthly Summary
		Physical Data Sheets
1260	1	X-Rays
1294	2	Ultraviolet Radiation
1277	3	Infrared Radiation
1138	5	Noise
1207	6	Excessive Heat
1276	7	Increased Pressure
1075	9	Dampness
1269	12	Cobalt-60
1306	13	Strontium-90
1288	14	Tritium
1264	15	Krypton-85
1273	16	Iridium-192
1281	17	Thorium
1297	18	Radium
1275	19	Leak Testing of Sealed Radioactive Sources
1284	20	Microwaves
		Respiratory Protection Data Sheets
1189	1	Self-Contained Breathing Masks
1223	2	Acid Gas Masks
998	3	Organic Vapor Masks
999	4	Acid Gases and Organic Vapors
942	5	Ammonia Gas Masks
1198	6	Carbon Monoxide Gas Masks
945	7	Universal Gas Masks
958	8	Hose Masks--Type A
959	9	Hose Masks--Type B
969	10	Air-Line Respirators
960	11	Blasting Helmets

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Respiratory Protection Data Sheets (cont.)
936	13	Dispersoid Respirators Toxic Dusts
1157	17	Chemical Cartridge Respirators--Organic Vapors
1176	18	Chemical Cartridge Respirators--Acid Gases
1177	19	Chemical Cartridge Respirators--Acid Gases and Organic Vapors
1173	20	Chemical Cartridge Respirators--Ammonia
997	21	Chemical Cartridge Respirators--Mercury Vapor
1206	22	Massachusetts Sales Representatives of Manufacturers of Respiratory Protective Equipment
947	23	Chemical Cartridge Respirators--Dispersoids and Organic Vapors
1230	24	Dispersoid Respirators--Highly Toxic Dusts
1215	25	Respiratory Protective Devices
1178	26	Chemical Cartridge Respirators--Pesticides
1188	27	Chemical Cartridge Respirators--Paints, Lacquers, Enamels
1211	28	Dispersoid Respirators--Asbestos
1213	29	Dispersoid Respirators--Dusts, Fumes, Mists and Fibers
1214	30	Dispersoid Respirators--Pneumoconiosis and Fibrosis Producing Dusts and Mists
1248	31	Respirators Care and Maintenance Program
		Right to Know Sheets
1385	5	Consultation Program
1399(a)	1	Directory of Private Agencies and Organizations
1401(a)	3	Municipal Right to Know
1402(a)	4	MSDS Criteria Sheet
1400(a)	2	References for a Safer and Healthier Workplace
		Ventilation Data Sheets
1122	1	Planers
1094	2	Plating Tanks
1147	3	Spray Booths
1012	4	Portable Grinders

RECOMMENDED SAFE PRACTICE BULLETINS CURRENTLY AVAILABLE FOR DISTRIBUTION

Bull. No.	Data Sheet No.	Title
		Ventilation Data Sheets (cont.)
1259	5	Open Tanks
1107	6	Swing Frame Grinders
1209	7	Blasting Rooms
1315	8	Granite Blasting Rooms
1102	9	Tumblers--Hollow Trunnion Type
1053	10	Foundry Shakeout
1174	11	Weather Caps
1041	12	Soldering Bench
1196	13	Disc Grinder--Horizontal Single Spindle Type
1028	14	Disc Grinder--Vertical Spindle Type
1039	15	Grinding and Polishing Belt
1353	16	Portable Bench Grinder
1104	17	Bucket Elevator
1096	18	Melting Furnace, "Tilting"
1197	19	Pouring Station
1072	20	Make-Up Air
1258	21	Laboratory Hood
1318	22	Spray Painting Rooms

REPRINTS OF WRITINGS OF THE STAFF

Bull. No.	
1025	Mercury Contamination in the Dental Office. Journal of the Massachusetts Dental Society, Fall 1971, 8 pp.
1078	Concentration Adjustments in Urinalysis. American Industrial Hygiene Association Journal, September 1974, 7 pp.
1098	Mercury and the Hazards of Vacuum Cleaning. The New England Journal of Medicine, February 13, 1975, 1 p.
1274	Physical Assessments of the Oral Cavity. Occupational Health and Safety, July/August 1979, 2 pp.
1307	Asbestos Exposures in Massachusetts Public Schools. American Industrial Hygiene Journal, April 1980, 7 pp.
1336	The Occupational and Environmental Health History. Journal of American Medical Association, December 18, 1981, 6 pp.
1339	Exposure to Lead from the Mystic River Bridge: The Dilemma of Deleading. New England Journal of Medicine, March 18, 1982, 4 pp.
1343	Accelerated Loss of FEV-1 in Polyurethane Production Workers: A Four-Year Prospective Study. American Journal of Industrial Medicine 3:209-215 (1982).

MISCELLANEOUS BULLETINS

Bulletin No.	
169	Ventilation Degreasing Tank. January 1961. 1 p.
617	Standard Hoods for Grinding, Buffing, and Polishing. March 1952. 2 pp.
908	The Safe Operation of Vapor Degreasers. February 1967. 3 pp.
921	Ventilation Requirements for Control of Fumes from Electrical Arc Welding and Cutting. January 1968. 4 pp.
968	Control of Carbon Monoxide Gas in Automobile Garages. January 1970. 3 pp.
987	Inert Gas-Shielded Arc Welding. June 1970. 2 pp.
1143	Medical Examination of Personnel Exposed to Ionizing Radiation. September 1976. 2 pp.
1232	Guidelines for Office Buildings with Asbestos Fireproofing. January 1981. 2 pp.
1256	Role of the Occupational Health Nurse. May 1979. 2 pp.
1257	Role of the Occupatioanl Health Physician. May 1979. 1 p.
1266	Economic Value of Health Service Department. June 1979. 2 pp.
1270	Mercury Resource Information. September 1979. 1 p.
1271	The Occupational Health Unit. November 1979. 2 pp.
1299	Industrial Hygiene Services. April 1980. 1 p.
1319	Organic Phosphate Insecticides, Medical Control Procedures. June 1981. 3 pp.
1333	Recommendations for Dental Offices. January 1981.
1337	Tank Painting Hazards. August 1981. 1 p.
1338	History of Massachusetts Asbestos Commission. November 1980. 1 p.
1341	Significance of Urinary Mercury Concentration in Light of Change in MAC (TLV) for Mercury Vapor.
1364	Protocol for Investigation Bad Air Complaints. May 1985. 1 p.
1378	Occupational Health Programs. March 1986. 4 pp.

MISCELLANEOUS BULLETINS

Bulletin No.	
1379	Standard Operating Procedure for Removing Lead-Based Paint. April 1978. 2 pp.
1391	Recommended Safe Practice Bulletins Currently Available for Distribution. June 1986. 2 pp.
1362	"Right to Know" Compliance Assistance Package. August 1984. 11 pp.
1381	Glove Bag Removal Technique. 1 p.
1382	Glove Bag Emergency Procedures. 1 p.
1383	Full and Half-Face Respirator Fit Test. 4 pp.
1385	Consultation Program for the Massachusetts Right to Know Law. 4 pp.

MANUALS, BOOKLETS, ETC.

A Study of the Health Effects of Video Display Terminals in the Workplace. June 1986.

Massachusetts Right to Know. Employer Assistance Manual. February 1987.

Your Right to Know-An Employee's Guide to the Massachusetts Right to Know Law. 1987

Chemical Hazards on the Job. Your Right to Know. June 1987.

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